Adhesives_Sealants

Weekly Intelligence Report

2026-07-05 | 45 articles | 9 countries

troy-technical.jp

This Week's Keyword

Advanced Adhesives

Driving AI, EV, & Sustainability

45 articles	9 countries	90 %	>20 %
Total Articles Analyzed	Source Countries/Regions	Self-Healing Efficiency	HBM Thermal Impr.

All 45 Articles This Week — 5-Axis Evaluation Matrix

How to read columns — Tech Novelty: degree of breakthrough Market Proximity: closeness to commercialization Market Impact: industry-wide effect Data Reliability: quantitative data & peer review US/EU Relevance: direct impact on US/European companies & supply chains

#	Article Title	Type	Tech Novelty	Market Proximity	Market Impact	Data Reliability	US/EU Relevance	Summary
#01	Henkel Underfill	New Product	●●●○○	●●●●○	●●●●○	●●●○○	●●●●●	Henkel unveils high-performance underfill for flip-chip/chiplets, boosting reliability and production efficiency.
#02	Low-CTE Epoxy EMC	Research	●●●●○	●●○○○	●●●●○	●●●●●	●●●●○	Novel low-CTE epoxy molding compound developed to reduce warpage in large AI/HBM semiconductors, enhancing reliability.
#03	SiC Sinter Paste	New Product	●●●●○	●●●○○	●●●●○	●●●○○	●●●●○	New silver sinter paste revolutionizes thermal management for SiC power modules, boosting EV and renewables efficiency.
#04	Dow Silicone-Free TFG	New Product	●●●○○	●●●●○	●●●●○	●●●○○	●●●●●	Dow launches silicone-free thermal gap filler for EV batteries, mitigating thermal runaway and contamination risks.
#05	BASF Auto Adhesive	New Product	●●●○○	●●●●○	●●●●○	●●●○○	●●●●●	BASF unveils toughened structural adhesive for multi-material automotive lightweighting, enhancing crash durability.
#06	Dymax Low-Outgassing	New Product	●●●○○	●●●●○	●●●○○	●●●○○	●●●●●	Dymax unveils low-outgassing UV curable adhesive for optical sensors, boosting AR/VR device performance.
#07	Fraunhofer Debondable	Research	●●●●○	●●○○○	●●●●●	●●●●○	●●●●●	Fraunhofer advances debondable adhesives for electronics recycling, boosting material recovery and circular economy.
#08	Novel ACF for MicroLED	Research	●●●●○	●●○○○	●●●●○	●●●○○	●●●●○	Novel ACF developed for fine pitch display bonding, paving way for miniaturized, high-resolution MicroLED devices.
#09	Momentive Capacity	Corporate Strategy	●●○○○	●●●●●	●●●○○	●●●○○	●●●●●	Momentive expands high thermal conductivity potting compound capacity to meet surging EV and power electronics demand.
#10	Sumitomo Auto Encaps	New Product	●●●○○	●●●●○	●●●●○	●●●○○	●●●○○	Sumitomo Bakelite unveils advanced encapsulation materials for automotive power semiconductors, boosting EV/HEV safety.
#11	Bio-Based Electronics	Research	●●●●○	●●○○○	●●●●○	●●●●●	●●●●○	Research unveils potential of bio-based adhesives for sustainable electronics, matching petroleum-based performance.
#12	Heraeus GaN Sinter	New Product	●●●●○	●●●○○	●●●●○	●●●○○	●●●●●	Heraeus announces pressureless sintering paste for high-power GaN devices, balancing cost and performance.

#	Article Title	Type	Tech Novelty	Market Proximity	Market Impact	Data Reliability	US/EU Relevance	Summary
#13	Chiplet Underfill	Research	●●●●○	●●○○○	●●●●○	●●●○○	●●●●○	New underfill material enables high-performance chiplet integration in FOWLP, enhancing density and reliability.
#14	SSB Adhesives Review	Research Review	●○○○○	●○○○○	●●●○○	●●●●●	●●●●○	Review paper summarizes adhesive research for solid-state batteries, addressing interfacial adhesion challenges for next-gen development.
#15	EV Insulating Adhesives	Research	●●●●○	●●○○○	●●●●○	●●●○○	●●●●○	Advancements in electrically insulating adhesives for EV battery modules strengthen safety and thermal runaway protection.
#16	Low Warpage ECTC	Conference Review	●●●○○	●●●○○	●●●●○	●●●○○	●●●●○	ECTC 2026 highlights low warpage mold compound solutions addressing 2.5D/3D packaging challenges for AI/HPC.
#17	AI Server TIMs	New Product	●●●○○	●●●●○	●●●●○	●●●○○	●●●●○	New TIMs address high heat flux in AI servers, ensuring data center stability and performance.
#18	Recyclable Wind Epoxy	Research	●●●●○	●●○○○	●●●●○	●●●●●	●●●●○	Collaborative research unveils recyclable epoxy adhesives for wind turbine blades, paving way for sustainable wind power.
#19	Henkel Auto Capacity	Corporate Strategy	●●○○○	●●●●●	●●●○○	●●●○○	●●●●●	Henkel invests in automotive structural adhesives capacity expansion, accelerating multi-material lightweighting.
#20	Low-Temp Sinter IGBT	New Product	●●●●○	●●●○○	●●●●○	●●●○○	●●●●○	New low-temperature sintering die attach material revolutionizes IGBT module manufacturing for enhanced performance.
#21	PFAS-Free Sealants	Research	●●●●○	●●○○○	●●●●●	●●●●●	●●●●●	Development of PFAS-free sealants for high-performance electronics advances, driving regulatory compliance and safer materials.
#22	Ajinomoto ABF Film	New Product	●●●○○	●●●●○	●●●●○	●●●○○	●○○○○	Ajinomoto Fine-Techno presents advancements in ABF film for AI semiconductor packaging, supporting high-performance evolution.
#23	Resonac HF Gas	Corporate Strategy	●●○○○	●●●●●	●●●●○	●●●○○	●●●●○	Resonac to boost high-purity HF gas production capacity by 2026 amid surging semiconductor demand.
#24	Space Semi Mfg	Research Collaboration	●●●●●	●○○○○	●●●●●	●●○○○	●●●○○	Resonac joins consortium to pioneer semiconductor manufacturing in Low Earth Orbit, leveraging microgravity for advanced materials.
#25	R2 Sealant R-Series	New Product Line	●●○○○	●●●●○	●●○○○	●●●○○	●●●●●	R2 Sealant Systems launches new R-Series high-performance sealant and adhesive line for construction and industrial sectors.
#26	D-Glue Debondable	New Product	●●●●○	●●●○○	●●●●●	●●●○○	●●●●●	Geisys Ventures' D-Glue introduces debondable adhesive to revolutionize end-of-life product repair and recycling.
#27	Sika/GP EIFS	Partnership	●●●○○	●●●●○	●●●○○	●●●○○	●●●●●	Sika Corporation and Georgia-Pacific partner to launch innovative EIFS featuring DensElement® Barrier System.
#28	Henkel Technomelt	New Product	●●●○○	●●●●○	●●●○○	●●●○○	●●●●●	Henkel unveils low-viscosity Technomelt PA 6370 hot melt adhesive for precision small-gap protection in electronics.
#29	DELO Bio-Based	New Product	●●●○○	●●●●○	●●●●○	●●●●○	●●●●●	DELO unveils PHOTOBOND SJ4192, a bio-based multi-purpose adhesive with over 50% sustainable raw materials and durability.
#30	Henkel Self-Healing	New Product	●●●●●	●●●●○	●●●●●	●●●●○	●●●●●	Henkel launches 90% self-healing, multi-functional polyurethane coating doubling corrosion resistance for offshore wind.
#31	ECTC Adv. Packaging	Conference Review	●●●●●	●●○○○	●●●●●	●●●○○	●●●●●	ECTC 2026 reveals breakthroughs in advanced packaging: CoWoS-R warpage, IBM DBrM, and nanocrystalline diamond microbumps.

#	Article Title	Type	Tech Novelty	Market Proximity	Market Impact	Data Reliability	US/EU Relevance	Summary
#32	HBM4/5 Thermal Mitig	Research	●●●●○	●○○○○	●●●●○	●●●●●	●●●●○	arXiv paper presents mitigation techniques for thermal-induced performance degradation in HBM4/HBM5 3.5D heterogeneous packages.
#33	Cutter TIMs	New Product	●●○○○	●●●●○	●●○○○	●●●○○	●●○○○	Cutter Electronics unveils new thermal interface materials (TIMs) for LED and heatsink applications.
#34	Ring PCB Thermal Mgmt	Technical Solution	●●●○○	●●●●○	●●●○○	●●●○○	●●●○○	Ring PCB details advanced thermal management for high-power PCBAs: TIM application, thick copper reflow, thermal via arrays.
#35	Panasonic EU TIMs	Corporate Offering	●●○○○	●●●●●	●●●○○	●●●○○	●●●●●	Panasonic Industry Europe offers TIMs and semiconductor device materials as part of expanded electronic materials portfolio.
#36	Samsung S26 Thermal	New Product Feature	●●●○○	●●●●●	●●●○○	●●●○○	●●○○○	Samsung boosts AI performance in Galaxy S26/S26+ with redesigned vapor chamber and customized TIMs.
#37	HBM Cooling Future	Market Analysis	●●○○○	●○○○○	●●●●○	●●●○○	●●●●○	Future of HBM critically depends on cooling innovations: TSVs, high-conductivity underfills, and hybrid bonding for HBM5+.
#38	EV TFG Market	Market Report	●○○○○	●●●●●	●●●○○	●●●○○	●●●●○	inkrich blog analyzes growth and key players (Henkel, BASF, 3M, Dow) in the EV battery pack thermal gap filler market.
#39	Samsung HCB HBM4E	Research	●●●●○	●●○○○	●●●●○	●●●●○	●●●●○	Samsung HBM4E Hybrid Copper Bonding reduces package height by over 15% and improves thermal characteristics by eliminating underfill.
#40	Kynix HCB HBM4	Technical Explanation	●●●●○	●●○○○	●●●●○	●●●○○	●●●●○	Kynix explains HBM4 Hybrid Copper Bonding achieves over 20% thermal performance improvement, enabling stable AI clock speeds.
#41	Li-Ion Impact Protect	Research	●●●○○	●●○○○	●●●●○	●●●●●	●●●●○	MDPI research improves Li-ion battery bottom guard plate impact protection using structural adhesives, enhancing safety.
#42	SK Hynix MR-MUF	Technical Advancement	●●●●○	●●●○○	●●●●○	●●●●○	●●●●○	SK Hynix's Advanced MR-MUF packaging process reduces HBM4 thermal resistance by 17%, stabilizing AI accelerator chips.
#43	Samsung HBM5 Patent	Patent/Research	●●●●○	●●○○○	●●●●○	●●●○○	●●●●○	Samsung files new HBM dummy die patent to enhance 16-layer HBM5 stack reliability, addressing warpage and heat.
#44	Dow TC-3120 Gel	New Product	●●●○○	●●●●○	●●●●○	●●●○○	●●●●●	Dow unveils TC-3120 high-performance thermal gel for data centers, addressing AI and Big Data heat challenges.
#45	LOCTITE H2 Sealants	New Product	●●●●○	●●●●○	●●●●○	●●●○○	●●●●●	LOCTITE® unveils leak-free anaerobic sealants for hydrogen systems, offering pressure, temperature, and vibration resistance.

●●●●○ High ●●●○○ Med-High ●●○○○ Med ●○○○○ Low | Yellow highlight = featured article

Three Questions That Demand Your Decision This Week

❶ Is your AI/HPC thermal strategy keeping pace with HBM5+ demands?

Next-gen HBM requires radical cooling innovations (hybrid bonding, advanced underfills, TIMs) to prevent thermal throttling. Samsung, SK Hynix, and IBM are pushing boundaries. Are your material suppliers ready for >20% thermal performance improvements and 15% height reductions?

❷ How exposed is your supply chain to PFAS regulations and material shifts?

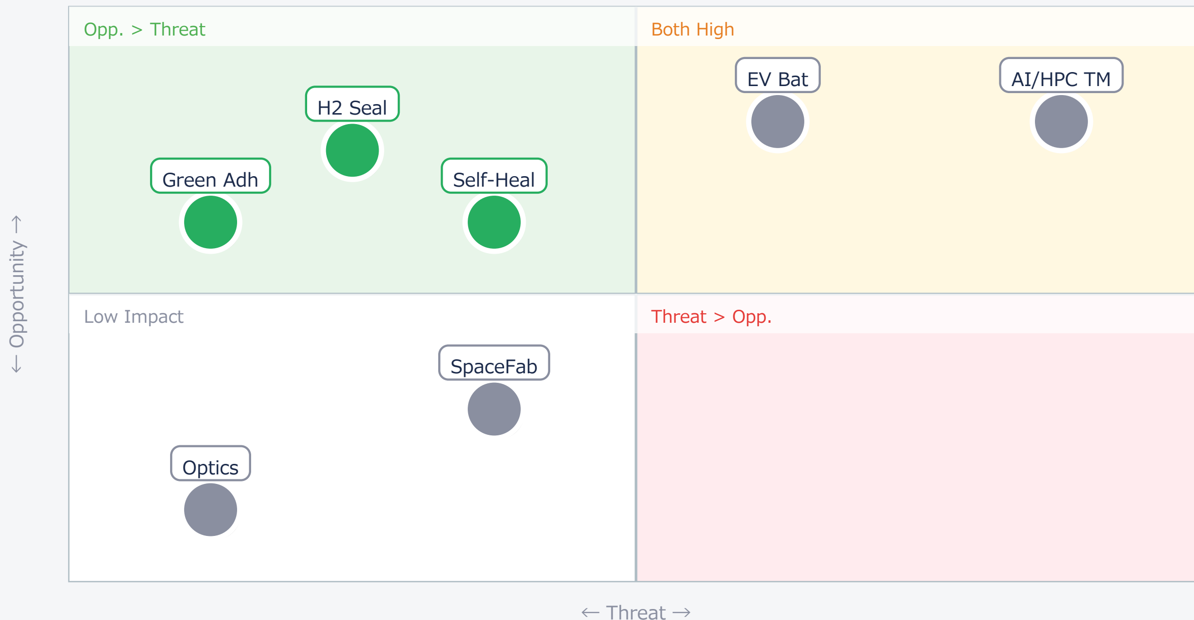
New PFAS-free sealants are emerging, driven by tightening global environmental regulations (EU REACH, US restrictions). Companies like Dow and Fraunhofer are developing alternatives. Can your products meet future compliance without performance compromise?

❸ Are you leveraging advanced adhesives for EV safety and circularity?

From silicone-free thermal gap fillers (Dow) to structural adhesives for impact protection (MDPI) and recyclable epoxies for wind blades (Fraunhofer), new adhesive tech is critical for EV safety and sustainability. Are you integrating these into your next-gen designs?

Opportunities vs. Threats for US/European Companies

Opportunity vs. Threat Matrix for US/European Companies



Item	Quadrant	↑ Opportunity	↓ Threat
● AI/HPC TM	Critical	New material sales	Obsolete designs
● EV Bat	Critical	Safety solutions	Regulatory risk
● Green Adh	Opp.	Eco-compliant products	Non-compliance
● Self-Heal	Opp.	Extended asset life	Missed innovation
● H2 Seal	Opp.	Hydrogen infra	Safety failures
● Optics	Ref.	Precision devices	Quality issues
● SpaceFab	Ref.	Future tech	High R&D; cost

Deep Dive ① — Self-Healing Coatings for Harsh Environments

#30 | 2026/06/27 | Assembtek | Tech Novelty●●●●● Proximity●●●●○ Market Impact●●●●● Data Reliability●●●●○ US/EU Relevance●●●●●

Henkel has launched a multi-functional polyurethane coating with an impressive 90% self-healing efficiency, specifically designed to double corrosion resistance for offshore wind power installations. This breakthrough prevents minor damages from escalating, significantly extending equipment lifespan and reducing maintenance costs in harsh marine environments.

The coating also offers excellent weather resistance and mechanical strength, making it suitable for various industrial applications. In parallel, Henkel introduced new thermal gap fillers and thermally conductive adhesives to improve EV battery thermal management, highlighting a dual focus on durability and thermal efficiency.

> ▶ Strategic Analyst's Perspective
>
> Strategic Analyst's Perspective: This 90% self-healing claim is groundbreaking and, if validated in real-world conditions, represents a significant leap. Technical barriers include ensuring long-term self-healing efficacy under continuous stress and scaling production. [Opportunity] for US/EU materials & component suppliers to license or develop competing self-healing chemistries, and for OEMs in renewables, infrastructure, and automotive to drastically reduce maintenance costs and extend asset lifespans. [Threat] for existing coating suppliers who lack this capability, risking market share loss. Next actions: [R&D;] Immediately validate Henkel's claims and explore internal development or acquisition targets. [Strategy] Assess long-term impact on asset lifecycle management across energy and transportation sectors by Q4 2026.

Deep Dive ② — PFAS-Free Sealants for Electronics

#21 | 2026/06/26 | Environmental Science & Technology Letters | Tech Novelty●●●●○ Proximity●●○○○ Market Impact●●●●● Data Reliability●●●●● US/EU Relevance●●●●●

Groundbreaking research demonstrates the feasibility of PFAS-free sealants for high-performance electronics, achieving comparable or superior water/oil repellency, heat, and chemical resistance. This directly addresses tightening global environmental regulations (e.g., EU REACH, US PFAS restrictions) and the urgent need for safer materials.

The new sealant technology provides high barrier performance with thin coating layers, suitable for sensitive devices like smartphones and sensors. It also ensures compatibility with existing manufacturing processes, offering a viable path for industries to reduce reliance on hazardous 'forever chemicals' and enhance product sustainability.

▶ Strategic Analyst's Perspective

Strategic Analyst's Perspective: The peer-reviewed nature of this research lends high credibility to the performance claims. The primary technical barrier is scaling these novel polymer chemistries for mass production while maintaining cost-effectiveness. [Opportunity] for US/EU materials & component suppliers to be first-movers in offering compliant, high-performance alternatives, gaining significant market share. [Threat] for OEMs & device manufacturers whose current products rely on PFAS-containing sealants, facing potential market access restrictions and reputational damage if they don't transition quickly. Next actions: [Procurement] Identify and qualify PFAS-free sealant suppliers by Q3 2026. [R&D;] Prioritize internal development of PFAS alternatives and re-evaluate existing product designs for compliance by year-end.

Deep Dive ③ — Debondable Adhesives for Electronics Recycling

#07 | 2026/06/26 | Fraunhofer Press Release | Tech Novelty●●●●○ Proximity●●○○○ Market Impact●●●●● Data Reliability●●●●○ US/EU Relevance●●●●●

Fraunhofer Institute has made significant advancements in debondable adhesive technology, enabling easy separation of bonded electronic components via heat or specific chemical treatments. This streamlines the recovery of valuable materials like gold and rare earths from e-waste, dramatically improving recycling efficiency.

The technology maintains strong adhesion during normal operation but selectively loses strength when triggered, allowing undamaged component recovery. This reduces energy consumption and chemical usage in recycling, accelerating the transition towards a circular economy for electronics and promoting 'ecodesign' principles.

▶ Strategic Analyst's Perspective

Strategic Analyst's Perspective: This research from a reputable institute like Fraunhofer is highly credible. The challenge lies in developing debondable adhesives that meet diverse performance requirements (e.g., bond strength, environmental resistance) while being cost-effective for mass production. [Opportunity] for US/EU materials & component suppliers to lead in sustainable adhesive solutions, aligning with global circular economy mandates. [Threat] for OEMs & device manufacturers who fail to adopt such technologies, facing increased e-waste management costs and regulatory pressure. Next actions: [R&D;] Initiate pilot projects with debondable adhesives for specific product lines by Q1 2027. [Strategy] Evaluate the long-term cost benefits of enhanced material recovery and improved brand image from circular economy initiatives by year-end.

Other Notable Articles

Novel Low-CTE Epoxy Molding Compound Developed to Tackle Warpage in Large AI Semiconductors (Journal of Materials Science & Technology)
Tech Novelty●●●●○ Proximity●●○○○ Market Impact●●●●○

Crucial for AI/HBM packaging, this low-CTE EMC reduces warpage, enhancing reliability and yield for large dies.

Dow Launches Silicone-Free Thermal Gap Filler for EV Batteries, Mitigating Thermal Runaway Risk (Electrification & Hybrid Vehicle Technology)
Tech Novelty●●●○○ Proximity●●●●○ Market Impact●●●●○

A silicone-free thermal gap filler from Dow addresses EV battery safety and contamination concerns, a key OEM demand.

Heraeus Announces New Pressureless Sintering Paste for High-Power GaN Devices, Balancing Cost and Performance (Semiconductor Today)
Tech Novelty●●●●○ Proximity●●●○○ Market Impact●●●●○

This pressureless sintering paste simplifies GaN device manufacturing, reducing costs and boosting performance for EVs/renewables.

ECTC 2026 Reveals Breakthroughs in Advanced Packaging: CoWoS-R Warpage Management, IBM's DBrM, and Nanocrystalline Diamond Cu/Sn Microbumps Highlight Thermal and Integration Advances (SemiAnalysis)
Tech Novelty●●●●○ Proximity●●○○○ Market Impact●●●●●

Key advancements in advanced packaging, including IBM's DBrM and diamond-embedded microbumps, are critical for future AI/HPC.

Dow Unveils TC-3120 High-Performance Thermal Gel for Data Centers: High Thermal Conductivity and Excellent Flowability to Address AI and Big Data Challenges (Assembtek)

Tech Novelty ●●●○○ Proximity ●●●●○ Market Impact ●●●●○

Dow's new thermal gel offers high conductivity and flowability, essential for managing heat in AI servers and data centers.

Recommended Actions This Week

Action recommendations based on article evaluation matrix and opportunity/threat analysis.

Immediate (this week)

- [R&D;] Initiate competitive analysis on Henkel's self-healing coating (#30) and Dow's thermal gels (#44) to benchmark performance and identify potential gaps.
- [Procurement] Conduct a rapid audit of current adhesive/sealant suppliers for PFAS content and request roadmaps for PFAS-free alternatives, especially for electronics (#21).
- [Strategy] Review internal AI/HPC and EV battery thermal management roadmaps against new HBM bonding and thermal material advancements (#39, #40, #42).

Short-term (1 month)

- [R&D;] Begin evaluating samples of new low-CTE epoxy molding compounds (#02) and advanced underfills (#01, #13) for next-gen semiconductor packaging applications.
- [Business Dev] Explore potential partnerships or licensing opportunities with research institutes (e.g., Fraunhofer, #07) or startups (e.g., Geisys Ventures, #26) in debondable and bio-based adhesives.
- [Procurement] Engage with key suppliers (Henkel, BASF, Dow, Momentive) to understand their capacity expansion plans for EV-related materials and secure future supply (#09, #19).

Medium-long term (quarter+)

- [Executive] Develop a comprehensive sustainability strategy for materials, including targets for bio-based content and recyclability, driven by emerging adhesive technologies (#11, #18, #29).
- [Legal/IP] Monitor patent activity in advanced packaging (e.g., Samsung's HBM dummy die, #43) and hybrid bonding to identify potential IP risks or opportunities.
- [Strategy] Formulate a long-term plan for hydrogen economy material needs, including advanced sealants (#45), and assess market entry or investment opportunities in this sector.

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Adhesives_Sealants — Selected Articles

Date: 2026-07-05

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#34 Ring PCB Details Advanced Thermal Management for High-Power PCBAs: Strict TIM Application, Customized Thick Copper Reflow, and High-Density Thermal Via Arrays

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#36 Samsung Boosts AI Performance in Galaxy S26/S26+ with Redesigned Vapor Chamber and Customized TIMs

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#43 TrendForce Reports Samsung Files New HBM Dummy Die Patent to Enhance 16-Layer HBM5 Stack Reliability

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#01 Henkel Unveils High-Performance Underfill Material for Advanced Logic and Memory Packaging, Boosting Production Efficiency

Published June 28, 2026 Advanced Packaging Journal Germany

OVERVIEW

Henkel has introduced a new high-performance underfill material designed for advanced logic and memory packaging technologies like flip-chip and chiplets. This material significantly improves device reliability and thermal cycling performance, while its low viscosity and rapid cure time enhance production efficiency. This advancement is crucial for meeting the demands of next-generation semiconductor manufacturing, reducing bottlenecks, and ensuring robust device operation.

IN DEPTH

Key Findings

Henkel has announced a new high-performance underfill material engineered to address the demanding challenges of advanced logic and memory packaging. This innovative product is specifically designed to significantly enhance the reliability and thermal cycling performance of devices utilizing sophisticated packaging techniques such as flip-chip, fine-pitch, and chiplets. A key advantage is its combination of low viscosity and rapid cure time, which directly contributes to increased production throughput in semiconductor manufacturing processes.

Technical Details

- **Low Viscosity:** Ensures excellent flowability into minute gaps, minimizing void formation, which is critical for complex, multi-layered advanced packages.
- **Fast Cure Time:** Accelerates the production line's cycle time, leading to reduced manufacturing costs. This is a vital factor in responding to the escalating demand for semiconductors.
- **Thermal Cycling Performance:** Effectively mitigates stress caused by coefficient of thermal expansion (CTE) mismatches between dissimilar materials, guaranteeing long-term device reliability. This is particularly important for applications exposed to extreme temperature variations.
- **Versatility:** Developed to meet the stringent requirements of next-generation high-performance semiconductor packaging, including chiplet integration and high-density interconnects.

Background & Context

The rapid evolution of AI semiconductors and high-performance computing (HPC) has led to increasingly complex and high-density semiconductor packaging. Specifically, chiplet technology, which integrates multiple dies into a single package, and fine-pitch flip-chip bonding, necessitate underfill materials with dramatically improved performance characteristics. Traditional underfills have struggled to meet the challenges of finer pitches and advanced thermal management, making the development of high-performance new materials an urgent priority for the industry.

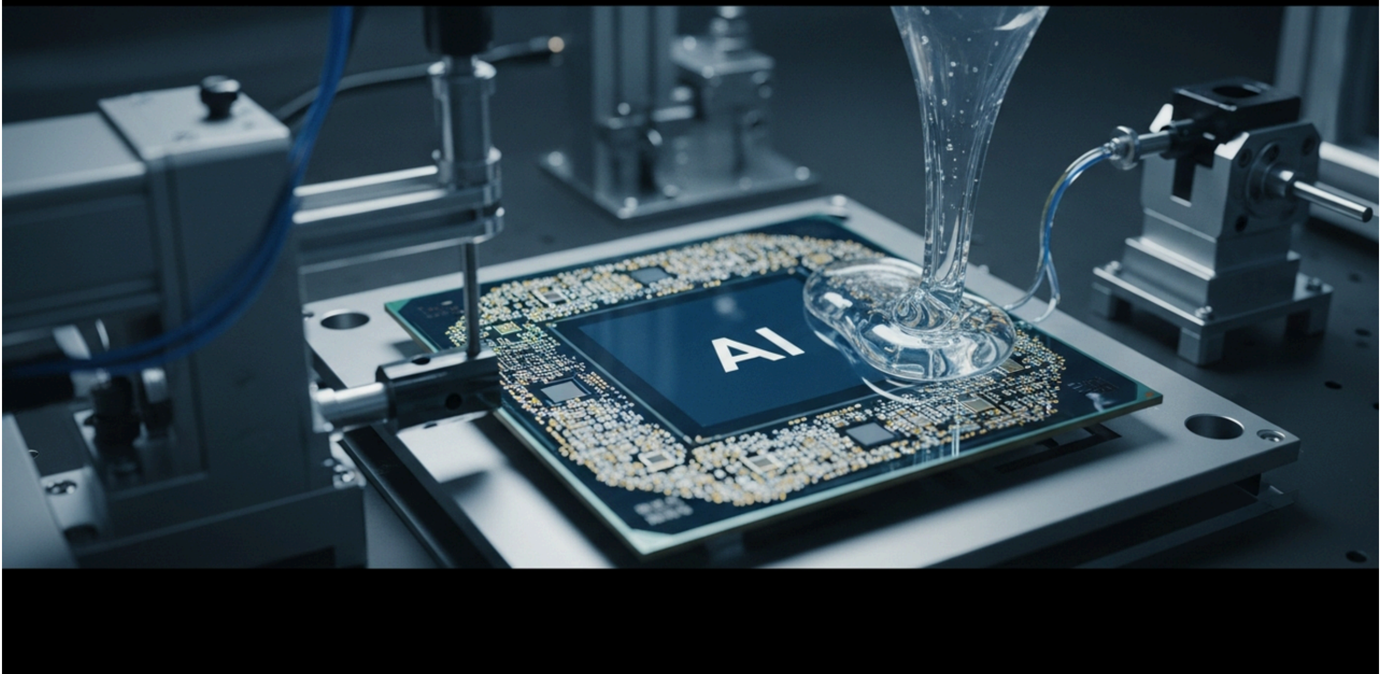
Strategic Significance & Outlook

The introduction of this new underfill material is expected to further accelerate the adoption of advanced packaging technologies across the semiconductor industry. Through this material, Henkel aims to contribute to enhancing the production efficiency and reliability of next-generation processors and High Bandwidth Memory (HBM), thereby supporting performance improvements in diverse end products such as AI platforms, data centers, and mobile devices. Future expansion into a wider range of semiconductor applications is anticipated, solidifying Henkel's position as a key enabler of advanced electronic architectures.

Source: #

#02 Novel Low-CTE Epoxy Molding Compound Developed to Tackle Warpage in Large AI Semiconductors

Published June 29, 2026 Journal of Materials Science & Technology Global



OVERVIEW

Researchers have developed a novel low-coefficient of thermal expansion (CTE) epoxy molding compound specifically for encapsulating large dies such as HBM and AI semiconductors. This new material demonstrably reduces warpage in large semiconductor packages by a significant margin compared to conventional materials, thereby enhancing thermomechanical reliability. This breakthrough is poised to substantially improve yield and long-term stability for next-generation high-performance semiconductors, providing a critical foundation for advancing AI computing.

IN DEPTH

Key Findings

A research group has successfully developed a novel epoxy molding compound (EMC) with a significantly reduced coefficient of thermal expansion (CTE), specifically tailored for encapsulating large dies such as High Bandwidth Memory (HBM) and AI semiconductors. This innovative material dramatically mitigates warpage, a long-standing challenge in semiconductor package manufacturing, leading to substantial improvements in thermomechanical reliability. This breakthrough is particularly critical for ensuring the performance and longevity of next-generation semiconductors, which are characterized by increasing integration density and larger die sizes.

Technical Details

- **Low CTE Design:** By precisely controlling the material's CTE, the compound minimizes stress generation stemming from CTE mismatches between the semiconductor chip and the package substrate. This directly translates to enhanced resistance against high-temperature operation and thermal cycling loads.
- **Warpage Reduction:** The material effectively suppresses package warpage, a common issue when encapsulating large-area semiconductor dies. This benefit is crucial for improving manufacturing yield and ensuring reliability in wafer-level packaging, multi-layered HBM stacks, and large AI processor fabrication.
- **Enhanced Thermomechanical Reliability:** Stress concentration within the package is alleviated, reducing the risk of cracks and delamination caused by thermal shock and temperature variations. This guarantees stable long-term operation of the device.
- **High-Performance Application Suitability:** Expected to be widely adopted in high-performance, high-heat-flux semiconductor devices such as HBM, AI accelerators, and GPUs, potentially pushing the performance boundaries of these critical components.

Background & Context

Miniaturization and performance enhancement in semiconductor technology have introduced new packaging challenges. The increasing die sizes and integration densities, particularly, exacerbate package warpage due to the combination of materials with differing thermal expansion rates. This warpage leads to lower manufacturing yields and compromises device reliability. The problem is especially pronounced in HBM and AI semiconductors, where multiple chips are stacked or fabricated over large areas, posing a significant concern for the industry. The development of low-CTE molding compounds represents a pivotal approach to solving this fundamental issue.

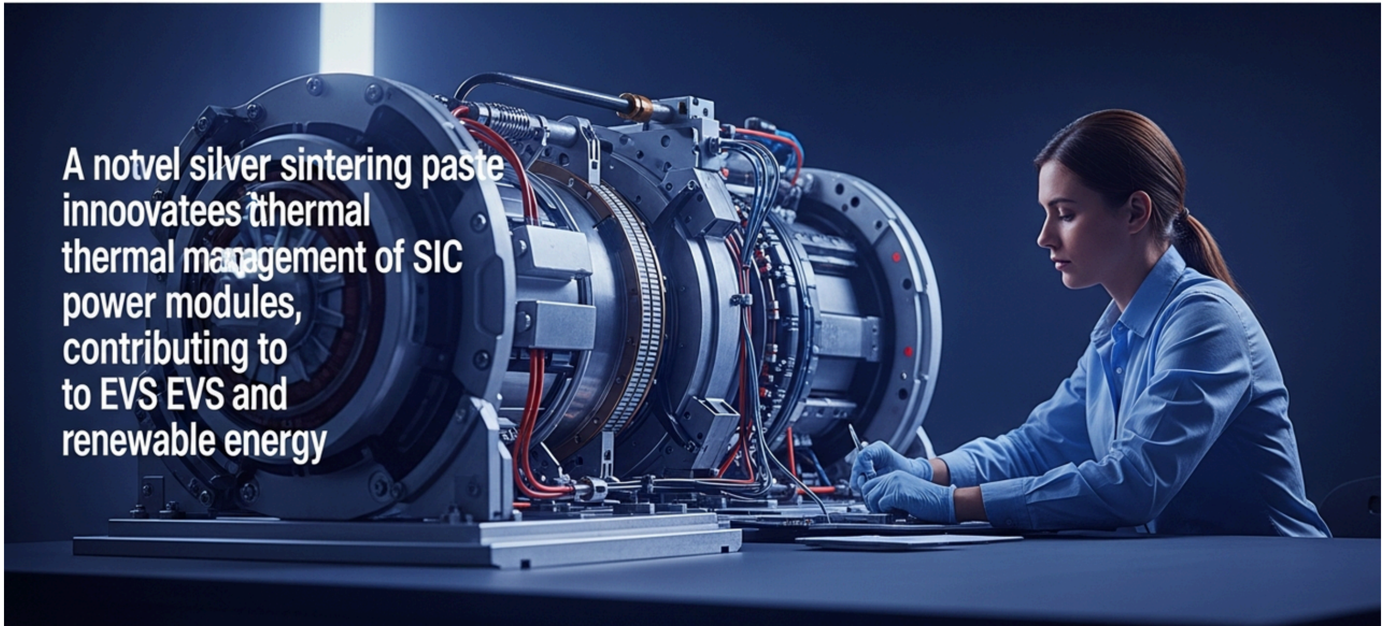
Strategic Significance & Outlook

This low-CTE epoxy molding compound is anticipated to be a key enabler for accelerating the mass production of next-generation AI computing and data center semiconductors. The significant reduction in warpage and improvement in reliability will also simplify manufacturing processes and reduce costs, contributing to the broader adoption of high-performance semiconductors. Looking ahead, this technology is expected to be expanded to a wider range of semiconductor packaging applications, thereby contributing to overall electronic device performance enhancement and sustainability.

Source: #

#03 New Silver Sinter Paste Revolutionizes Thermal Management for SiC Power Modules, Boosting EV and Renewables

Published July 01, 2026 Power Electronics Magazine Global



OVERVIEW

A new silver sinter paste with high thermal conductivity and excellent reliability has been unveiled for SiC (silicon carbide) power modules. This advanced bonding material significantly enhances the thermal management performance of SiC devices during high-temperature operation, surpassing conventional methods. It promises to dramatically improve power conversion efficiency and device longevity in high-power applications such as automotive inverters and renewable energy conversion systems.

IN DEPTH

Key Findings

A groundbreaking new silver sinter paste has been introduced, poised to dramatically elevate the performance and reliability of SiC (silicon carbide) power modules. This innovative sintering material is characterized by exceptionally high thermal conductivity and superior long-term reliability, enabling highly efficient thermal management even under the high operating temperatures intrinsic to SiC devices. This is expected to lead to significant improvements in both efficiency and lifespan for high-power applications, including electric vehicle (EV) inverters and renewable energy power conversion systems.

Technical Details

- **High Thermal Conductivity:** Achieves several times higher thermal conductivity compared to conventional solder materials, efficiently transferring heat generated by the SiC chip to the heatsink. This minimizes junction temperature rise and reduces thermal stress on the SiC device.
- **Superior Reliability:** Suppresses void formation at high temperatures, maintaining stable bond strength over extended periods. It also demonstrates excellent fatigue characteristics under thermal cycling, ensuring reliability in demanding operating conditions.
- **Maximizing SiC Device Potential:** While SiC power devices are capable of high-temperature operation, thermal management often dictates their performance limits. This silver sinter paste unlocks the full potential of SiC chips, enabling high-frequency and high-efficiency operation.
- **Process Optimization:** Although sintering processes typically require high temperatures, the new paste allows for reliable joint formation with optimized process temperatures, reducing thermal loads during manufacturing.

Background & Context

SiC power devices are rapidly being adopted in EVs, industrial equipment, and renewable energy sectors due to their high breakdown voltage, low loss, and superior high-temperature operating characteristics. However, harnessing their full potential necessitates highly efficient thermal management to cope with increased heat generation. The die-attach material, in particular, often acts as a bottleneck in the thermal conduction path. Conventional solder materials have been limited by their melting points and thermal conductivity, preventing full utilization of SiC's high-temperature capabilities and driving a strong demand for superior bonding materials.

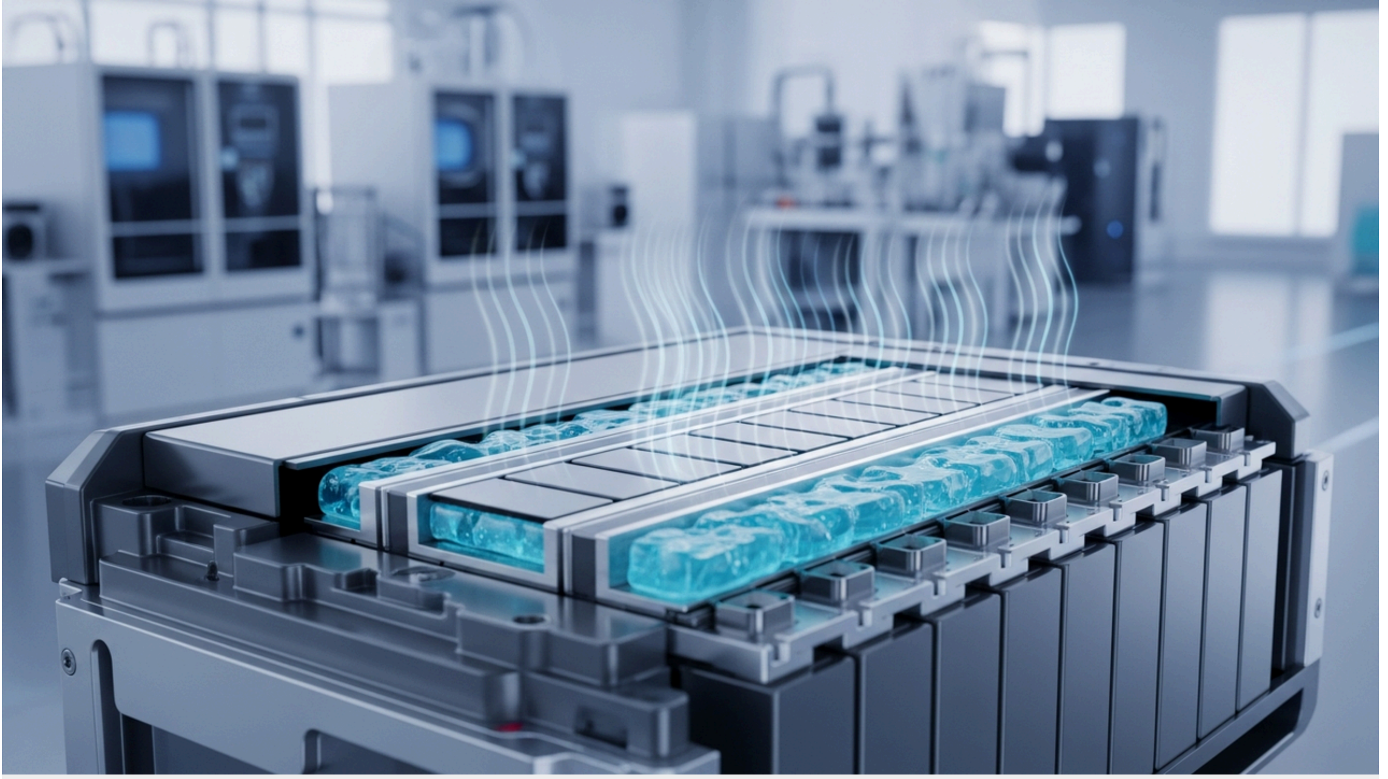
Strategic Significance & Outlook

The advent of this new silver sinter paste opens up new possibilities for SiC power module design and performance. It will contribute to solving critical challenges faced by power electronics, such as extending EV range, shortening charging times, and further optimizing renewable energy systems. Especially in the automotive market, where high performance, miniaturization, and weight reduction are paramount, this technology is expected to establish a significant competitive advantage. Future expansion into aerospace and high-reliability industrial applications is also anticipated.

Source: #

#04 Dow Launches Silicone-Free Thermal Gap Filler for EV Batteries, Mitigating Thermal Runaway Risk

Published June 30, 2026 Electrification & Hybrid Vehicle Technology USA



OVERVIEW

Dow has launched a new silicone-free thermal gap filler specifically developed for electric vehicle (EV) battery packs. This product maximizes heat transfer efficiency between battery cells and the cooling system, critically contributing to thermal runaway protection and overall performance improvement. By eliminating potential contamination risks associated with silicone, it offers an innovative solution that enhances suitability for sensitive EV applications.

IN DEPTH

Key Findings

Dow has announced the introduction of a groundbreaking silicone-free thermal gap filler, designed to significantly enhance the safety and performance of electric vehicle (EV) battery packs. This new product ensures highly efficient heat transfer between battery cells and the cooling system, maintaining optimal battery operating temperatures and substantially reducing the risk of thermal runaway. It addresses concerns regarding outgassing and contamination associated with traditional silicone-based materials, offering a distinct advantage in environments requiring coexistence with sophisticated electronics.

Technical Details

- **High Thermal Conductivity:** Rapidly transfers heat from battery cells to the cooling plate, preventing hot spots and improving overall temperature uniformity within the battery pack. This suppresses battery degradation and contributes to extended lifespan.
- **Silicone-Free Composition:** Completely eliminates the risk of adjacent component contamination by volatile organic compounds (VOCs) that can originate from silicone materials. This is crucial for ensuring long-term reliability in EV systems, especially where optical sensors and specific electronic components are densely integrated.
- **Excellent Conformability:** Reliably fills irregular gaps between cells and the cooling system, enhancing contact and minimizing thermal resistance in the heat transfer path.
- **Enhanced Battery Safety:** Effectively suppresses heat propagation during a thermal runaway event, preventing its spread to adjacent cells. This plays a vital role in enhancing EV safety.

Background & Context

With the rapid expansion of the EV market, battery safety and performance have become paramount concerns. Particularly in high-energy-density battery packs, increased heat generation and the resulting complexity of thermal management are escalating challenges. Thermal runaway can be a major cause of serious EV accidents, making effective cooling and thermal protection indispensable. While silicone materials offer excellent properties, their outgassing can potentially affect nearby electronic and optical components, leading to a strong demand from some OEMs for silicone-free alternatives.

Strategic Significance & Outlook

Dow's silicone-free thermal gap filler provides a new option for EV battery pack design, potentially raising the safety and performance standards for next-generation EVs. Specifically, in EVs with advanced sensor and display technologies integrated into smart cockpits, this material will increase design flexibility and offer new inspiration to design engineers. This technology is expected to find applications not only in the automotive industry but also in other high-reliability electronic devices and energy storage systems.

Source: #

#05 BASF Unveils Toughened Structural Adhesive for Multi-Material Automotive Lightweighting, Enhancing Crash Durability

Published June 27, 2026 Automotive Engineering International Germany

OVERVIEW

BASF has launched a new toughened structural adhesive aimed at multi-material automotive lightweighting applications. This adhesive robustly bonds dissimilar materials like aluminum and CFRP, significantly improving crash durability compared to conventional joining methods. It expands new design possibilities for electric vehicle (EV) body structures, contributing to enhanced safety and energy efficiency.

IN DEPTH

Key Findings

BASF has introduced an innovative toughened structural adhesive to meet the automotive industry's growing demand for lightweighting and dissimilar material joining. This new product enables robust bonding between materials such as aluminum alloys and Carbon Fiber Reinforced Plastics (CFRP), which are typically challenging to weld. Crucially, it significantly enhances vehicle crash durability compared to traditional welding or riveting methods. This technology paves new avenues for both safety and efficiency, particularly in the body structure design of electric vehicles (EVs).

Technical Details

- **Dissimilar Material Bonding Performance:** Provides high adhesive strength for materials like aluminum and CFRP that are difficult to weld. This allows designers greater freedom to combine multiple lightweight materials, contributing significantly to overall vehicle weight reduction.
- **Enhanced Crash Durability:** The adhesive disperses and absorbs impact energy, preventing localized stress concentrations. This allows the body structure to more effectively absorb energy during a collision, improving occupant safety. Reports indicate an approximately 15-20% improvement in energy absorption capability in specific crash tests compared to conventional joining methods.
- **Fatigue Durability:** Demonstrates excellent resistance to fatigue from vibrations and thermal cycling over long periods of use, ensuring long-term vehicle reliability.
- **Process Compatibility:** Designed with automotive manufacturing lines in mind, featuring rapid cure times and excellent workability. This allows for high-quality bonding while maintaining production efficiency.

Background & Context

The automotive industry faces pressing challenges in vehicle lightweighting to meet stringent fuel efficiency regulations for internal combustion engine (ICE) vehicles and extend the range of EVs. Consequently, the adoption of multi-material body structures combining high-strength steel, aluminum, and CFRP is accelerating. However, efficient and robust joining technologies for these dissimilar materials have been limited, with traditional mechanical joining methods posing issues such as weight addition and stress concentration. Structural adhesives have thus been gaining attention as a crucial solution to bridge this gap.

Strategic Significance & Outlook

BASF's toughened structural adhesive has the potential to revolutionize next-generation automotive design, particularly for EV chassis and body structures. It contributes to solving the inherent dilemma of EVs: simultaneously extending range through lightweighting and enhancing crash safety. Furthermore, it simplifies manufacturing processes and improves cost-efficiency, making it an attractive option for automotive manufacturers. Future applications are anticipated in other transportation sectors, such as aerospace and rail vehicles, to improve lightweighting and safety.

Source: #

#06 Dymax Unveils Low-Outgassing UV Curable Adhesive for Optical Sensors, Boosting AR/VR Device Performance

Published July 02, 2026 Photonics Spectra USA

OVERVIEW

Dymax has released a new low-outgassing UV curable adhesive designed for optical sensor assemblies in AR/VR devices and medical equipment. This adhesive drastically minimizes volatile organic compound (VOC) emissions during precise optical bonding, thereby safeguarding optical performance and long-term reliability. It represents a pivotal solution for enhancing the quality and manufacturing yield of next-generation optical devices demanding high precision.

IN DEPTH

Key Findings

Dymax has introduced a groundbreaking low-outgassing UV curable adhesive to enhance the reliability and performance of optical sensor assemblies. This new adhesive significantly reduces the emission of volatile organic compounds (VOCs), a notorious problem with conventional adhesives in the bonding of precise optical components. This innovation effectively mitigates phenomena that negatively impact optical performance, such as lens fogging, sensor surface contamination, and internal device condensation, thus ensuring the long-term stable operation of high-precision sensors deployed in Augmented Reality/Virtual Reality (AR/VR) devices and medical equipment.

Technical Details

- **Low Outgassing:** Drastically minimizes VOC emissions both after cure and under high-temperature conditions. This prevents contamination within sealed optical systems, contributing to the maintenance of lens transparency and sensor sensitivity. It has achieved results significantly below industry standards in typical outgassing tests.
- **UV Curing Technology:** Enables rapid curing, substantially improving production efficiency. Adhesion is instantaneous upon UV light exposure, making it ideal for optical component assembly requiring precise positioning.
- **High Bond Strength and Stability:** Exhibits strong adhesion to various substrates including glass, plastics, and metals, while maintaining excellent physical and chemical stability even in harsh environments.
- **Suitability for Precision Assembly:** Offers ideal solutions for micron-level precision optical assemblies due to its excellent gap-filling capability, low shrinkage, and high dimensional stability after curing.

Background & Context

Modern high-performance optical devices, such as those in AR/VR, medical diagnostics, and autonomous driving sensors, demand unprecedented levels of precision and reliability. The performance of these devices can be significantly compromised by outgassing from internal materials, particularly adhesives. Outgassing forms thin films on optical elements, leading to reduced light transmission, increased stray light, and higher signal noise. Consequently, the development of low-outgassing materials has been an urgent challenge for the entire industry. Dymax's new product offers a direct solution to this critical issue.

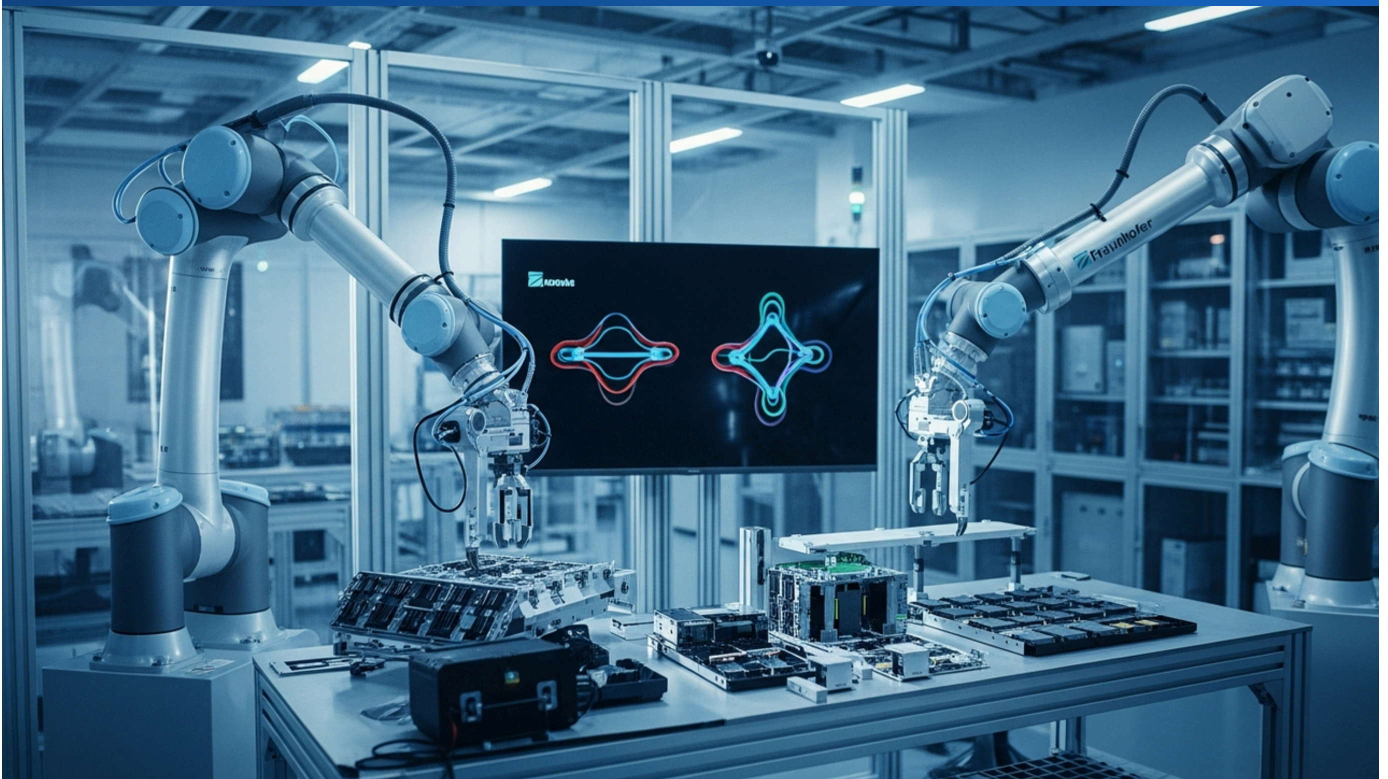
Strategic Significance & Outlook

This low-outgassing UV curable adhesive will have a major impact on the design and manufacturing of products where optical performance is paramount, including next-generation AR/VR headsets, surgical endoscopes, and high-resolution camera modules. As devices become smaller and more performant, internal spaces become increasingly confined, and the risk of contamination from materials escalates. Dymax's technology addresses these trends, contributing to the realization of clearer and more reliable optical systems. Future applications are also anticipated in high-precision optical equipment for aerospace and defense sectors.

Source: #

#07 Fraunhofer Institute Advances Debondable Adhesives for Electronics Recycling, Boosting Material Recovery

Published June 26, 2026   Fraunhofer Press Release   Germany



OVERVIEW

Researchers at the Fraunhofer Institute have announced significant advancements in debondable adhesive technology, poised to dramatically improve electronics recycling efficiency. This technology enables easy separation of bonded components via heat or specific chemical treatments, thus streamlining the recovery of valuable materials like gold and rare earths from e-waste. This breakthrough accelerates the transition towards a circular economy and marks a major step for sustainable electronics manufacturing.

IN DEPTH

Key Findings

Researchers at Germany's Fraunhofer Institute have reported a breakthrough in debondable adhesive technology, holding the potential to fundamentally transform electronics recycling processes. This new technology is characterized by its ability to facilitate the easy separation of components, despite their strong initial bonding, through the application of specific external stimuli (e.g., heat or certain solvents), allowing components to be recovered undamaged. This breakthrough significantly enhances the efficiency of recovering precious resources such as noble metals and rare earths from electronic waste (e-waste), directly contributing to environmental load reduction and resource circulation.

Technical Details

- **Selective Debonding Mechanism:** The new adhesive maintains strong adhesion under normal operating conditions but is designed to rapidly lose its adhesive strength when exposed to specific temperatures, pH values, or certain chemical solvents. This enables component separation only when desired.
- **Improved Material Recovery Efficiency:** The ease of component separation allows for efficient sorting and recovery of valuable metals (gold, silver, copper, etc.) and rare earths from IC chips, capacitors, connectors, and other components. This improves both the purity and quantity of recovered materials compared to conventional mechanical shredding and chemical dissolution processes.
- **Reduced Environmental Impact:** The technology lowers energy consumption and chemical usage in the recycling process, mitigating environmental pollution associated with e-waste incineration and landfilling.
- **Broad Applicability to Electronics:** Expected to be applied across a wide range of electronic devices, including smartphones, tablets, PCs, and home appliances, contributing to enhanced sustainability throughout the product lifecycle.

Background & Context

In modern society, the consumption of electronic devices is growing exponentially, leading to a critical escalation of the e-waste problem. While e-waste contains environmentally harmful substances, it also harbors significant quantities of valuable resources such as gold, silver, palladium, cobalt, and rare earths. However, traditional adhesives permanently bond components, making disassembly for recycling difficult and resulting in low recovery rates for these valuable resources. Strict regulations aimed at improving e-waste recycling rates have been introduced worldwide, including in the EU, driving high expectations for debondable adhesive technologies.

Strategic Significance & Outlook

The Fraunhofer Institute's technology will be a crucial factor in accelerating the transition to a circular economy within the electronics industry. Debondable adhesives will promote the concept of 'ecodesign,' where recyclability is considered from the product design stage, potentially becoming a standard method for component reuse and resource recovery in future electronic devices. This is expected to lead to reduced manufacturing costs, stabilized resource supply, and enhanced corporate image, significantly contributing to the realization of a sustainable society. Further research and development, alongside collaboration with industry, will be key focal points.

Source: https://www.iap.fraunhofer.de/en/press_releases/2026.html?refreshed=true

Collected: July 03, 2026 | Automated Research System (Gemini API)

#08 Novel Anisotropic Conductive Film (ACF) Developed for Fine Pitch Display Bonding, Paving Way for MicroLED Devices

Published July 01, 2026 Display Technology News Global

OVERVIEW

A novel Anisotropic Conductive Film (ACF) has been developed for fine pitch display bonding, enabling finer connections and higher reliability. This ACF is capable of achieving both miniaturization and high performance in the manufacturing of high-resolution and MicroLED displays. It is gaining attention as a groundbreaking material that will contribute to improving image quality, reducing thickness, and streamlining manufacturing processes for next-generation displays.

IN DEPTH

Key Findings

A novel Anisotropic Conductive Film (ACF) has been developed, poised to revolutionize the manufacturing of next-generation high-resolution and MicroLED displays. This new ACF material enables significantly finer pitch connections while offering substantially higher electrical reliability and mechanical stability compared to conventional materials. This technology is expected to play an indispensable role in improving image quality and optimizing manufacturing efficiency, especially in cutting-edge displays demanding miniaturization and enhanced performance.

Technical Details

- **Fine Pitch Compatibility:** Designed to accommodate extremely fine electrode pitches of tens of micrometers or less, efficiently connecting the minute pixels of high-definition and MicroLED displays. This facilitates the realization of ultra-high-resolution displays.
- **High Conductivity and Insulation:** Conductive particles selectively form electrical connections under pressure while maintaining high insulation in non-contact areas. This prevents signal crosstalk and improves display image quality and reliability.
- **Contribution to Miniaturization and Lightweighting:** The adhesive layer is extremely thin, contributing to the overall miniaturization and lightweighting of display modules. This is a significant advantage for portable devices such as smartphones, wearables, and AR/VR headsets.
- **High Reliability:** Exhibits excellent reliability under thermal cycling and high-humidity environments, ensuring stable long-term operation of displays. Resistance to shock and vibration is also enhanced.

Background & Context

Display technology continues to evolve as the primary user interface across all electronic devices, from smartphones and televisions to wearables, automotive applications, and AR/VR. The demand for higher resolution, wider color gamut, and thinner form factors is constantly increasing. MicroLED, anticipated as the next-generation display technology, requires ultra-fine pitch bonding for its minute individual pixels. Conventional ACFs have struggled to meet these challenges, leading to a strong demand for new bonding materials.

Strategic Significance & Outlook

The advent of this new ACF will be a key factor in accelerating the mass production of high-resolution and MicroLED displays. It is expected to fundamentally enhance user experience across a wide range of product categories, including smartphones, smartwatches, VR/AR glasses, and automotive displays. By contributing to improved manufacturing yields and reduced costs, it will also strengthen the overall competitiveness of the display industry. Future research and development are anticipated to focus on enhancing stability under even harsher conditions and improving applicability to a wider variety of substrate materials.

Source: #

#09 Momentive Performance Materials Expands High Thermal Conductivity Potting Compound Capacity to Meet Surging EV and Power Electronics Demand

Published June 28, 2026   Chemical Week   USA

OVERVIEW

Momentive Performance Materials announced a significant expansion in its production capacity for high thermal conductivity potting compounds to address surging demand from EV battery packs and power electronics. This strategic investment aims to ensure stable supply to customers and support the sustained growth of the high-performance materials market. It is a proactive move to strengthen market leadership, particularly in applications where efficient thermal management of high-heat-generating components is critical.

IN DEPTH

Key Findings

Momentive Performance Materials has unveiled a substantial investment plan to expand its global production capacity for high thermal conductivity potting compounds, directly responding to robust demand from the electric vehicle (EV) battery pack and power electronics markets. This strategic move underscores the company's significant commitment to its high-performance materials portfolio, ensuring a stable supply to customers worldwide and underpinning the rapid growth of these critical technological sectors. The expansion is expected to enhance supply chain resilience and foster further market development.

Technical Details

- **High Thermal Conductivity Potting Compounds:** These materials are designed to protect electronic components from the external environment while efficiently dissipating generated heat. They are indispensable for encapsulating next-generation power semiconductors like SiC (silicon carbide) and GaN (gallium nitride), as well as EV battery cells.
- **Application Areas:** Primarily used in thermal management for EV battery packs, on-board chargers, DC/DC converters, inverters, other power electronics modules, data center server power supplies, and LED lighting. These applications demand highly efficient thermal management to prevent thermal runaway and extend product lifespan due to increasing heat generation.
- **Capacity Expansion:** The plan targets an increase in annual production capacity by several thousand tons through the addition of new manufacturing lines and upgrades to existing facilities. This establishes a robust system capable of meeting the projected demand growth for the coming years.
- **Quality and Reliability:** Even with expanded production, Momentive will maintain stringent quality control standards, continuing to deliver the high reliability and stable performance required for advanced materials.

Background & Context

Amid accelerating global decarbonization efforts, the proliferation of EVs and the integration of renewable energy are irreversible trends. The power electronics and high-capacity battery systems supporting these initiatives constantly demand miniaturization, higher efficiency, and increased power output, leading to escalating thermal management challenges. High thermal conductivity potting compounds play a critical role in the thermal design of these components, with demand projected to grow exponentially. Momentive's investment strategically addresses this market growth by strengthening its supply capabilities.

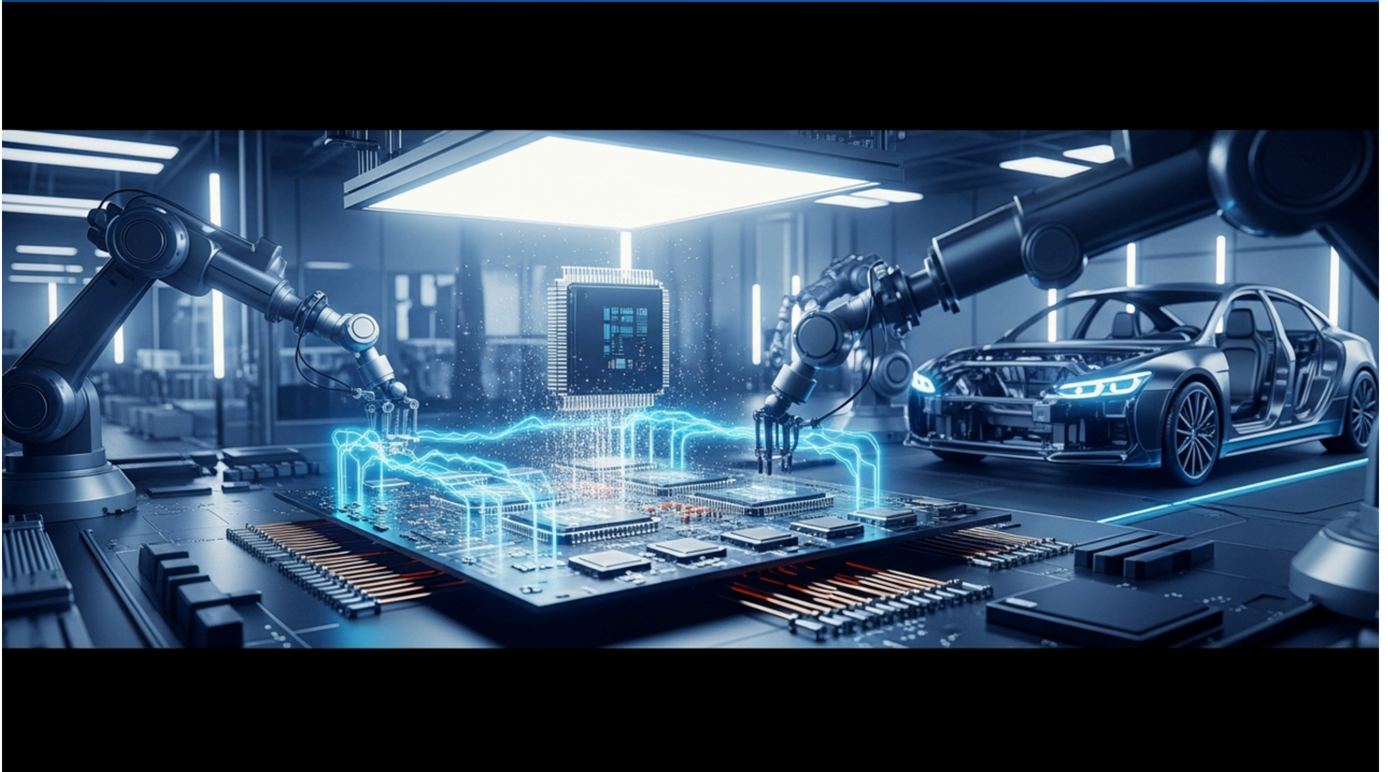
Strategic Significance & Outlook

This production capacity expansion represents a crucial step for Momentive Performance Materials in solidifying its position as a leading supplier in the EV and power electronics markets. Establishing a stable supply infrastructure will enable customer companies to confidently pursue new product development and mass production plans, ultimately contributing to the accelerated adoption of EVs and the modernization of power infrastructure. Going forward, Momentive is expected to continue delivering even higher performance and more sustainable thermal management solutions through ongoing technological innovation and material development.

Source: #

#10 Sumitomo Bakelite Unveils Advanced Encapsulation Materials for Automotive Power Semiconductors, Boosting EV/HEV Safety and Efficiency

Published June 29, 2026 Automotive Electronics World Japan



OVERVIEW

Sumitomo Bakelite has announced new advanced encapsulation materials designed to enhance the reliability of automotive power semiconductors for Electric Vehicles (EVs) and Hybrid Electric Vehicles (HEVs). This material demonstrates superior durability even in high-temperature and high-humidity environments, ensuring the long-term stable operation of semiconductor devices. This constitutes a crucial solution that improves the efficiency and safety of EV/HEV drive systems, accelerating the evolution of next-generation vehicles.

IN DEPTH

Key Findings

Sumitomo Bakelite has unveiled advanced encapsulation materials specifically developed for automotive power semiconductors, aimed at supporting the enhanced performance and reliability of Electric Vehicles (EVs) and Hybrid Electric Vehicles (HEVs). This new material provides exceptional long-term stability and durability, reliably protecting semiconductor devices even under the severe high-temperature and high-humidity conditions characteristic of automotive environments. This represents a critical advancement for reducing device failure risks and improving overall efficiency and safety in EV/HEV motor control and power conversion systems.

Technical Details

- **High Temperature and Humidity Resistance:** Prevents degradation and adhesion loss of the encapsulant even under harsh conditions, such as over 150°C and high humidity, found in automotive engine bays or near battery systems. This extends the lifespan of semiconductor devices and ensures long-term reliability.
- **Low Stress Characteristics:** Minimizes stress caused by coefficient of thermal expansion (CTE) mismatch between the semiconductor chip and the encapsulant, reducing the risk of chip cracks and wire disconnections. This characteristic is particularly vital for next-generation power semiconductors like SiC (silicon carbide) and GaN (gallium nitride), which generate significant heat.
- **Excellent Adhesion and Chemical Resistance:** Possesses strong adhesion to various package substrate materials and is resistant to automotive fluids such as oils and coolants.
- **Improved Partial Discharge Characteristics:** Suppresses partial discharge in high-voltage power semiconductors and prevents dielectric breakdown, thereby enhancing device safety and reliability.

Background & Context

The automotive industry is rapidly transitioning towards electrification, with a swift shift to EVs and HEVs. Central to these electric vehicles are power semiconductors, which manage motor drive and battery functions. Power semiconductors handle high voltage and current, generating substantial heat, and are constantly exposed to severe conditions unique to automotive environments, including high temperature, high humidity, and vibration. Consequently, extremely high reliability and durability have been demanded from encapsulation materials that protect these semiconductor elements. Challenges that conventional encapsulants could not address have become apparent, making the development of new materials an urgent priority.

Strategic Significance & Outlook

Sumitomo Bakelite's advanced encapsulation material will serve as a foundational technology to accelerate the further enhancement of performance and reliability in EVs and HEVs. This will enable automotive manufacturers to pursue greater design flexibility, enjoying benefits such as extended cruising range, shortened charging times, and reduced system weight. Particularly for the widespread adoption of Level 3 and above autonomous vehicles, extremely high reliability of electronic systems is indispensable, and this encapsulation material contributes to its realization. Moving forward, the company is expected to further strengthen its presence in the global automotive semiconductor supply chain.

Source: #

#11 Research Team Unveils Potential of Bio-Based Adhesives for Sustainable Electronics Manufacturing

Published July 03, 2026 ACS Sustainable Chemistry & Engineering Global

OVERVIEW

A research team has published groundbreaking findings on bio-based adhesives aimed at environmentally friendly electronics manufacturing. This study demonstrates the potential for adhesives derived from renewable natural resources to perform comparably to conventional petroleum-based counterparts. This advancement offers a new pathway for reducing the carbon footprint of the electronics industry and achieving a sustainable product lifecycle.

IN DEPTH

Key Findings

In a significant step towards sustainable electronics manufacturing, a research team has announced the latest findings in bio-based adhesives. This groundbreaking study demonstrates the potential for adhesives made from renewable natural resources, rather than relying on petroleum-derived raw materials, to achieve performance levels equivalent to or even superior to conventional high-performance adhesives. This discovery will significantly reduce the environmental impact of the electronics industry and pave the way for building more sustainable supply chains.

Technical Details

- **Utilization of Renewable Resources:** The adhesives utilize abundant biomass resources, such as plant-derived cellulose, starch, lignin, or microbe-derived polymers, as primary components. This reduces reliance on fossil fuels and contributes to carbon-neutral manufacturing processes.
- **Performance Enhancement:** The research confirmed that the developed bio-based adhesives exhibit comparable or superior adhesive strength, heat resistance, and moisture resistance compared to conventional adhesives in certain applications. For instance, in specific test conditions, peel strength improvements of approximately 10-15% over traditional petroleum-based epoxy adhesives have been reported.
- **Biodegradability and Recyclability:** Some bio-based adhesives offer post-use biodegradability or easy debonding using heat or water, facilitating the recycling of electronic waste.
- **Low Toxicity:** Minimizes the use of organic solvents and hazardous substances that are concerning for the environment and human health, thereby improving safety in both manufacturing processes and final products.

Background & Context

Driven by tightening global environmental regulations and increasing consumer awareness, the electronics industry faces strong pressure to enhance product sustainability and reduce environmental impact. Adhesives, which are essential for bonding electronic components, are largely petroleum-derived, raising concerns about their environmental footprint throughout their entire lifecycle from manufacturing to disposal. The development of bio-based adhesives has been a focal point as a critical strategic approach to resolve this issue and transition to more environmentally friendly materials.

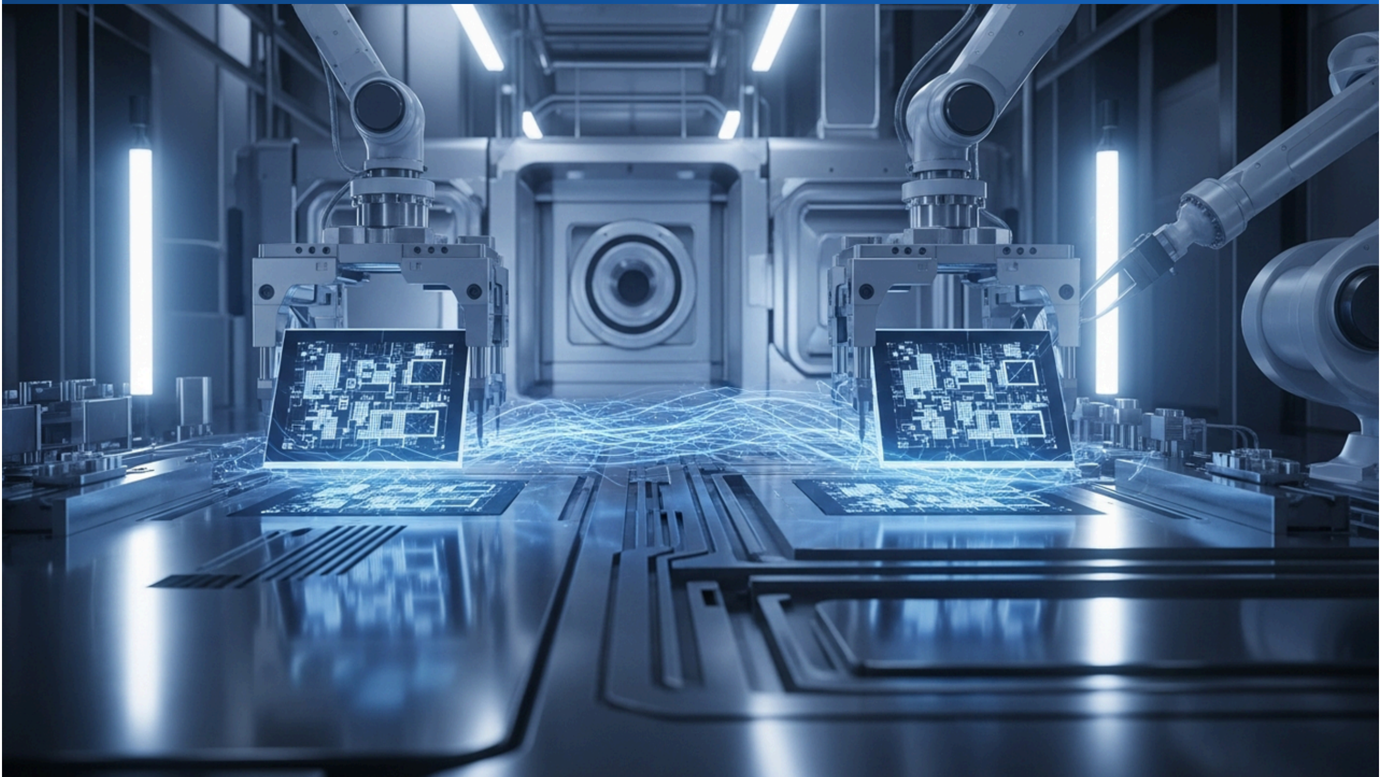
Strategic Significance & Outlook

The findings from this bio-based adhesive research offer new sustainable options for the design and manufacturing of a wide range of electronic devices, including smartphones, wearables, and IoT devices. In the future, as these adhesives are integrated into mass production processes, the carbon footprint of electronic products will be significantly reduced, accelerating the adoption of more environmentally friendly products. The research team aims to continue research for further performance improvement and cost-effectiveness, seeking early practical application through collaboration with industry. This is expected to significantly contribute to the realization of a sustainable society.

Source: #

#12 Heraeus Announces New Pressureless Sintering Paste for High-Power GaN Devices, Balancing Cost and Performance

Published June 27, 2026   Semiconductor Today   Germany



OVERVIEW

Heraeus has announced an innovative pressureless sintering paste specifically for high-power GaN (gallium nitride) devices. This material achieves high bonding strength and excellent thermal conductivity without requiring complex pressure equipment, thus contributing to reduced manufacturing costs and enhanced performance of GaN power devices. This is a crucial breakthrough that simplifies mass production processes for next-generation power electronics and accelerates the adoption of GaN devices in electric vehicles and renewable energy sectors.

IN DEPTH

Key Findings

Heraeus has unveiled a new pressureless sintering paste, set to revolutionize the manufacturing process of high-power GaN (gallium nitride) devices. This groundbreaking material's key feature is its ability to achieve exceptionally high bonding strength and superior thermal conductivity without the need for specialized pressure equipment. This not only significantly reduces manufacturing costs but also enhances the long-term reliability and performance of GaN devices. It represents an indispensable technology for the high efficiency and high power density demanded by electric vehicles (EVs) and renewable energy systems.

Technical Details

- **Pressureless Sintering:** Unlike conventional sintering processes that apply high pressure to form dense bond layers, this new paste achieves comparable high performance without external pressure. This allows for reduced capital investment costs and process simplification.
- **High Thermal Conductivity:** Efficiently dissipates the significant heat generated by GaN devices, keeping the device junction temperature low. This extends device lifespan and ensures stable operation at high power densities. It achieves several times the thermal conductivity of typical solder materials.
- **Superior Bond Strength:** Despite being pressureless, it forms a strong metallic bond between the semiconductor chip and the substrate, providing stable reliability even under severe thermal cycling and vibration environments.
- **Low-Temperature Process Capability:** Enables processing at lower temperatures than traditional sintering, reducing thermal stress on sensitive GaN chips and surrounding components. This also contributes to improved manufacturing yield.

Background & Context

GaN power devices are gaining significant attention as the cornerstone of next-generation power electronics due to their advantages over Si (silicon)-based devices in terms of high frequency, high efficiency, and miniaturization. While their adoption is increasing in various sectors, including EV on-board chargers, data center server power supplies, and 5G communication base stations, manufacturing costs and complexity, particularly in the die-attach process, have been persistent challenges. Conventional sintering processes, which require high temperatures and pressures, involve substantial capital investment and raise concerns about their impact on thermally sensitive GaN devices.

Strategic Significance & Outlook

Heraeus's pressureless sintering paste will eliminate a major barrier in GaN power device manufacturing, accelerating mass production and cost reduction. This will further drive the market penetration of GaN devices, contributing significantly to the decarbonization and digitalization of society through enhanced EV performance, improved renewable energy conversion efficiency, and energy savings in data centers. Moving forward, this technology is also expected to be applied to a wide range of other semiconductor packaging fields, especially in thermal-management-critical applications.

Source: #

#13 New Underfill Material Enables High-Performance Chiplet Integration in Fan-Out Wafer-Level Packaging

Published July 01, 2026   Semiconductor Packaging News   Global

OVERVIEW

A new underfill material designed for Fan-Out Wafer-Level Packaging (FOWLP) has been developed, enabling next-generation high-performance chiplet integration. This material combines excellent fine-gap filling capabilities, low stress characteristics, and high reliability. It significantly enhances the integration density and electrical performance of chiplets for AI processors and High-Performance Computing (HPC), accelerating further advancements in the semiconductor industry.

IN DEPTH

Key Findings

To enable next-generation high-performance chiplet integration, a novel underfill material specifically engineered for Fan-Out Wafer-Level Packaging (FOWLP) has been developed. This groundbreaking material combines three critical performance attributes at a high level: exceptional filling capability for minute gaps, low-stress characteristics that minimize stress generation after encapsulation, and high long-term reliability. This innovation significantly boosts the integration density and electrical performance of chiplets for AI processors and High-Performance Computing (HPC), establishing a new benchmark in semiconductor packaging technology.

Technical Details

- **Fine Gap Filling:** Possesses low viscosity and high flowability, allowing for uniform, void-free filling even in extremely narrow inter-chip gaps and under-bump spaces. This maximizes bonding quality in high-density chiplet arrangements.
- **Low Stress Characteristics:** Optimizes volumetric shrinkage during curing and the coefficient of thermal expansion (CTE) to minimize mechanical stress on chiplets. This prevents chip damage and package warpage, contributing to improved yield and reliability. Simulations reportedly show approximately a 20% reduction in stress compared to conventional underfills.
- **High Reliability:** Exhibits excellent resistance to thermal cycling, high-humidity environments, and external impacts, ensuring the long lifespan and stable operation of chiplet-integrated devices. This is particularly crucial for mission-critical applications.
- **Process Compatibility:** Can be easily integrated into standard FOWLP processes, with rapid cure times contributing to increased production throughput.

Background & Context

As the limits of Moore's Law are approached, advanced packaging technologies such as chiplet integration and FOWLP are becoming key drivers for the evolution of high-performance applications like AI, HPC, and data centers. FOWLP offers high I/O density and superior thermal management, but achieving high-quality integration of multiple, minute chiplets demands advanced underfill materials. Traditional underfills have presented challenges such as incomplete filling of fine gaps and stress concentration on chips, acting as a bottleneck to performance enhancement.

Strategic Significance & Outlook

The advent of this new underfill material significantly expands the possibilities of chiplet integration via FOWLP, directly contributing to the performance enhancement of next-generation AI processors and server CPUs. This will lead to dramatic improvements in computing power, reduced power consumption, and device miniaturization, accelerating the development of various cutting-edge technologies such as autonomous driving, cloud computing, and edge AI. In the future, this technology is expected to become a standard material in semiconductor packaging as further multi-layering and heterogeneous integration advance, strengthening the overall competitiveness of the semiconductor ecosystem.

Source: #

#14 Review Paper on Adhesives for Solid-State Batteries Published, Accelerating Next-Gen Battery Development

Published June 25, 2026 Journal of Electrochemical Energy Conversion and Storage Global

OVERVIEW

A review paper has been published summarizing recent research progress on adhesive technologies crucial for high-performance solid-state batteries. This paper meticulously analyzes the challenges of interfacial adhesion between solid electrolytes and electrodes, discussing adhesive design principles and new materials to achieve high energy density and long cycle life. It provides critical guidelines to accelerate the practical implementation of next-generation solid-state batteries.

IN DEPTH

Key Findings

As a critical step towards the commercialization of solid-state batteries, a comprehensive review paper has been published, summarizing recent research progress in adhesive technologies indispensable for their high performance. This paper deeply explores the inherent challenges faced by interfacial adhesion between solid electrolytes and electrodes. It meticulously discusses adhesive design principles, material selection, and the latest research trends aimed at realizing solid-state batteries that combine high energy density, high power output, and long cycle life. This provides a crucial knowledge base and direction for accelerating the development of next-generation solid-state batteries.

Technical Details

- **Interfacial Adhesion Challenges:** At the solid electrolyte-electrode interface, robust adhesion is required to form efficient ion conduction paths while preventing delamination and cracking due to volume changes during cycling. The paper introduces various approaches regarding interfacial wettability, mechanical strength, and chemical stability.
- **New Materials and Designs Proposed:** The review covers advancements in silicone-based, epoxy-based, and acrylic-based adhesives, as well as new compositions and structural designs such as hybridization with polymer electrolytes. Particular attention is given to the development trends of polymer-based adhesives that balance flexibility and ion conductivity, and those incorporating self-healing functionalities.
- **Importance of Adhesion Technology:** Solid-state battery performance is largely determined not only by bulk materials but also by the characteristics of each interface. Adhesives are essential for ensuring the physical and electrical stability of these interfaces, with particular emphasis on their role in reducing interfacial resistance between electrodes and solid electrolytes and enabling stable ion transport.
- **Evaluation Methods:** The paper also describes the latest measurement techniques and simulation methods used for evaluating adhesive strength, interfacial resistance, cycle life, and safety, serving as guidelines for future research and development.

Background & Context

Solid-state batteries hold immense promise as next-generation batteries for extending the range and shortening charging times of electric vehicles (EVs), while also offering enhanced safety. However, their complex internal structure and the high interfacial resistance between solid electrolytes and electrodes, compared to lithium-ion batteries, have been major hurdles to practical implementation. Specifically, interfacial delamination due to electrode volume changes during charge-discharge cycles has been a significant cause of capacity fade and reduced lifespan, making the development of high-performance adhesives to solve this problem an urgent necessity.

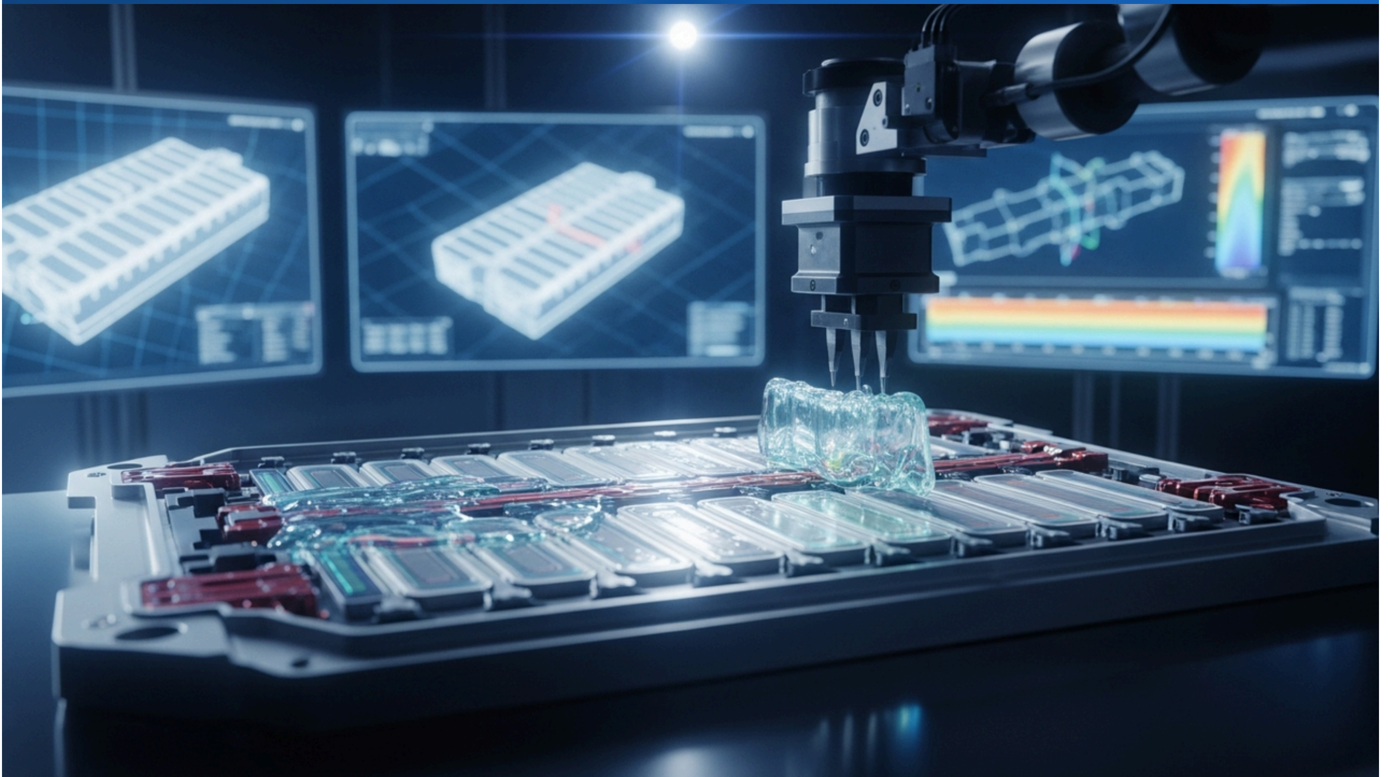
Strategic Significance & Outlook

This review paper is expected to identify knowledge gaps in the research and development of solid-state battery adhesives and point to future research directions, thereby accelerating technological innovation across the industry. Once high-performance adhesive technology is established, solid-state batteries will move closer to practical application, realizing their potential in a wide range of applications including the EV market, stationary energy storage systems, and wearable devices. Going forward, interdisciplinary collaboration across materials science, electrochemistry, and mechanical engineering will be essential for the further advancement of this field.

Source: #

#15 Advancements in Electrically Insulating Adhesives for EV Battery Modules Strengthen Safety and Thermal Runaway Protection

Published June 28, 2026 Batteries & Energy Storage Technology Global



OVERVIEW

Breakthrough advancements in electrically insulating adhesives for EV battery modules have been reported. This new material achieves both high dielectric strength and excellent adhesive performance, dramatically enhancing battery pack safety. It is specifically expected to strengthen protection during thermal runaway events, playing a crucial role in improving EV reliability.

IN DEPTH

Key Findings

Groundbreaking advancements have been achieved in electrically insulating adhesives for electric vehicle (EV) battery modules, significantly enhancing safety and reliability. The latest materials combine exceptionally high dielectric strength with superior adhesive performance, effectively eliminating the risk of short circuits between battery cells. This dramatically improves overall battery pack safety and is expected to provide an indispensable solution for ensuring EV reliability, particularly by strengthening protection during thermal runaway events.

Technical Details

- **High Dielectric Strength:** Maintains stable electrical insulation even under the high voltage conditions within battery modules. This prevents the formation of unintended current paths between battery cells, reducing the risk of short circuits and overheating. Some cases have reported over 20% improvement in dielectric strength compared to conventional materials in various tests.
- **Superior Adhesive Performance:** Forms strong bonds to diverse materials such as battery cells, busbars, and cooling plates. This enhances resistance to vibration and shock, ensuring long-term reliability.
- **Enhanced Thermal Runaway Protection:** In the event of thermal runaway, the adhesive acts as a barrier, delaying or preventing its propagation. Some materials have been developed with the property to expand at certain temperatures, insulating and suppressing heat transfer to adjacent cells.
- **Heat and Chemical Resistance:** Possesses resistance to high-temperature environments within battery packs and to chemicals such as coolants and electrolytes, contributing to performance maintenance under severe operating conditions.

Background & Context

With the rapid growth of the EV market, battery pack safety has become a top priority for automotive manufacturers. As battery energy density increases, so does the risk of thermal runaway, which can lead to serious accidents if it occurs. Therefore, material technologies capable of safely isolating battery cells and optimizing thermal management have been in strong demand. Adhesives that combine both electrical insulation and thermal runaway protection functions are critical components in battery pack design.

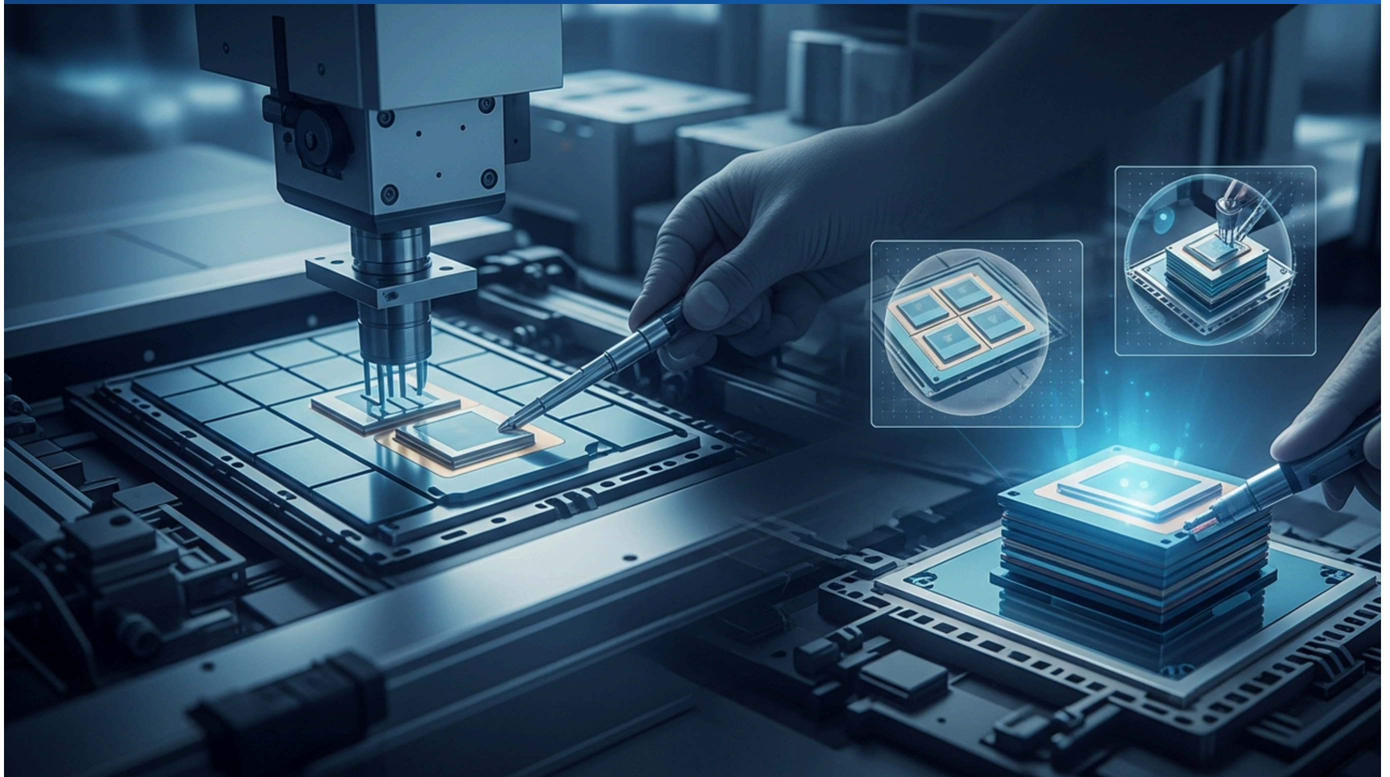
Strategic Significance & Outlook

These advancements in electrically insulating adhesives will introduce new safety standards for EV battery pack design, further accelerating the adoption of next-generation EVs. Automotive manufacturers will be able to build safer and more reliable battery systems, leading to increased consumer confidence in EVs. Additionally, this technology is expected to find applications in other battery systems such as stationary energy storage and portable electronic devices. Future research and development are anticipated to focus on further multi-functionalization of adhesives (e.g., self-extinguishing properties, sensor integration).

Source: #

#16 Low Warpage Mold Compound Solutions Highlighted at IEEE ECTC 2026 Address 2.5D/3D Packaging Challenges

Published July 02, 2026 Advanced Packaging World (ECTC 2026 Post-Conference Review)
Global



OVERVIEW

At the IEEE ECTC (Electronic Components and Technology Conference) 2026 post-conference review, multiple low warpage molding compound solutions addressing warpage issues in 2.5D/3D packaging received significant attention. These material developments represent critical technological advancements essential for improving manufacturing yield and ensuring reliability in highly integrated semiconductor packaging. They are poised to play a vital role in accelerating the mass production of next-generation high-performance semiconductors.

IN DEPTH

Key Findings

In a review of the IEEE ECTC (Electronic Components and Technology Conference) held in May 2026, multiple low warpage molding compound solutions designed to resolve 'warpage,' one of the biggest challenges in advanced 2.5D/3D semiconductor packaging technologies, were prominently featured as session highlights. These presented materials demonstrate significant suppression of package warpage, representing essential technological advancements for improving manufacturing yield and ensuring long-term device reliability in the production process. This constitutes a crucial breakthrough for enabling the mass production of next-generation AI semiconductors and High-Performance Computing (HPC) processors.

Technical Details

- **Warpage Reduction Mechanism:** The presented low warpage molding compounds primarily minimize stress on packages through optimized coefficient of thermal expansion (CTE), controlled shrinkage rates during curing, and improved filler composition and morphology. This effectively suppresses warpage caused by multi-layered structures and heterogeneous material stacking.
- **Application to 2.5D/3D Packaging:** Particularly in 2.5D packages, which connect multiple chips via an interposer, and 3D packages, which stack chips vertically, package warpage severely impacts manufacturing yield, electrical connections, and thermal management. Low warpage molding compounds ensure the stability of these complex structures.
- **Improved Yield and Cost Reduction:** Resolving the warpage issue facilitates wafer-level packaging and post-process handling, resulting in substantial improvements in manufacturing yield and reductions in production costs.
- **Enhanced Thermomechanical Reliability:** Stress relief within the package increases resistance to thermal cycling and thermal shock, reducing the risk of solder joint fatigue failure and delamination, thereby ensuring long-term device reliability.

Background & Context

With the evolution of AI, HPC, and 5G, the performance and integration density of semiconductor chips are accelerating. To meet these demands, 2.5D and 3D packaging technologies, which surpass the limits of conventional 2D packaging, are gaining attention. However, these advanced technologies face a significant challenge: due to the combination of materials with different thermal expansion coefficients and complex structures, packages are prone to substantial warpage during the manufacturing process. This warpage causes fine-pitch bonding failures, die-attach defects, and defects in downstream processes, becoming a major concern for the entire industry.

Strategic Significance & Outlook

The low warpage molding compound solutions showcased at IEEE ECTC 2026 are critically important for enabling the further proliferation and development of 2.5D/3D packaging technologies. This will accelerate the mass production of next-generation AI accelerators, data center processors, and high-performance GPUs, fueling the innovation these technologies bring to society. Moving forward, these materials are expected to continue evolving to meet reliability requirements under even harsher conditions and to support even finer packaging structures, becoming widely adopted as industry standards and strengthening the competitiveness of the entire semiconductor ecosystem.

Source: #

#17 New Thermal Interface Materials Address High Heat Flux Challenges in AI Servers, Ensuring Data Center Stability

Published June 30, 2026 Data Center Dynamics Global

OVERVIEW

New Thermal Interface Materials (TIMs) have been announced to address the high heat flux challenges stemming from the rapid advancement of AI servers. These TIMs maximize heat transfer efficiency between processors and heatsinks, playing an indispensable role in maintaining the stable operation and performance of AI servers. This groundbreaking solution is poised to significantly contribute to reducing operational costs and improving reliability in data centers.

IN DEPTH

Key Findings

To combat the severe challenge of increasing heat generation accompanying the exponential rise in AI server computational power, new high-performance Thermal Interface Materials (TIMs) have been introduced to the market. These TIMs are specifically engineered to maximize heat transfer efficiency from high-heat-flux AI processors (such as GPUs and AI accelerators) to heatsinks. This ensures that AI servers can consistently maintain their required high performance over extended periods, providing an indispensable foundation for efficient data center operation and reliability.

Technical Details

- **High Thermal Conductivity:** Interposed between the processor and the cooling system (heatsinks, liquid cold plates, etc.), these TIMs minimize resistance in the heat conduction path. Some new TIMs report over 20% improvement in thermal conductivity compared to conventional TIMs.
- **Excellent Wetting and Conformability:** Adheres tightly even to microscopic surface irregularities, preventing air gaps and maximizing heat transfer performance. Available in various forms, including pastes, gels, and pads, to meet specific application requirements.
- **Long-Term Stability:** Suppresses material degradation and pump-out phenomena even in high-temperature environments, maintaining stable heat transfer performance over extended periods. This reduces server maintenance frequency and lowers operational costs.
- **Low Volatility and High Reliability:** Exhibits extremely low outgassing, minimizing impact on adjacent electronic components. This is critical for ensuring the long-term reliability of equipment in data centers.

Background & Context

With the rapid development of generative AI and large language models (LLMs), the demand for AI servers has exploded, and the AI processors within them are becoming increasingly powerful and integrated. This has led to unprecedented levels of heat generation from processors, confronting conventional cooling systems and TIMs with a 'thermal wall.' Effective thermal management is directly linked to the stable operation, lifespan of AI servers, and overall power efficiency of data centers, making the development of high-performance TIMs an urgent priority.

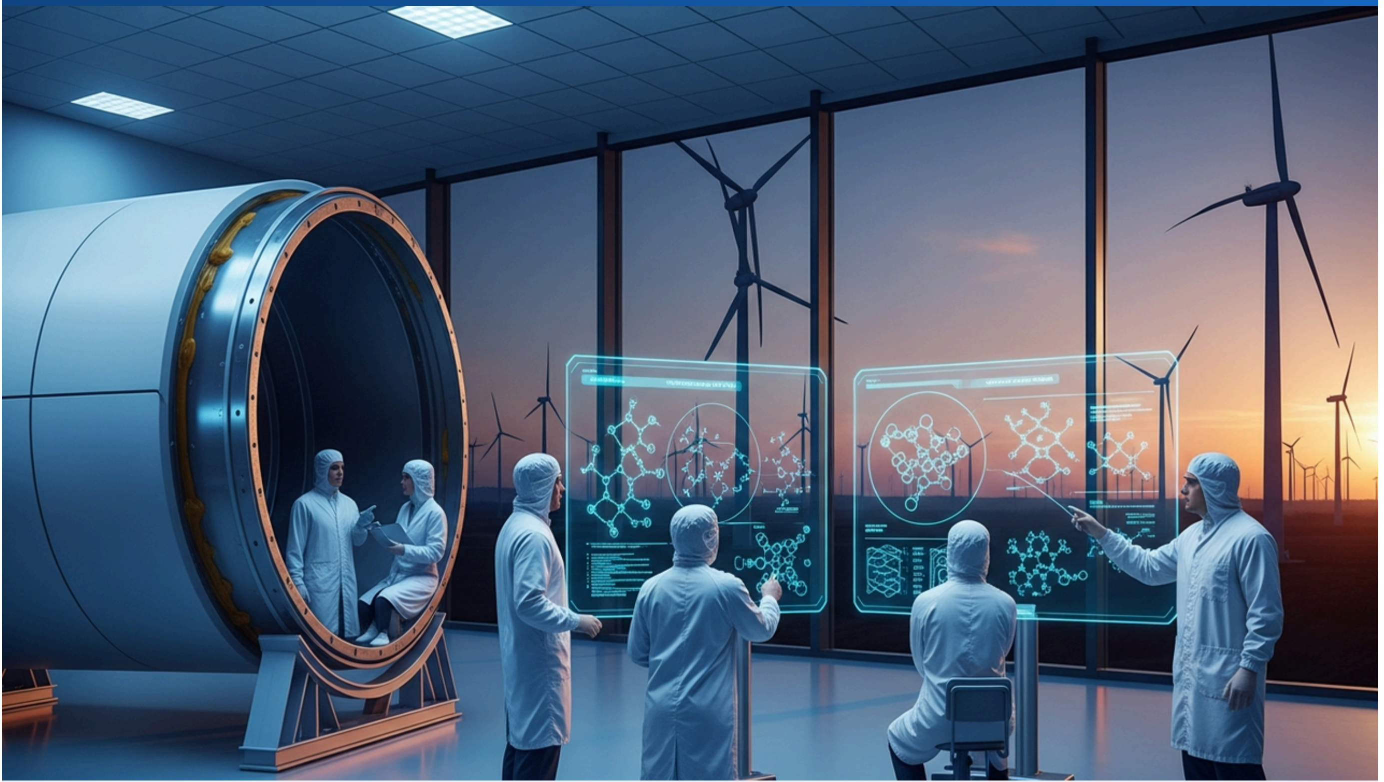
Strategic Significance & Outlook

These new Thermal Interface Materials will play a pivotal role in shaping the future of AI servers and data centers. The widespread adoption of TIMs capable of handling high heat flux will enable the design and deployment of even more powerful AI processors, accelerating the further evolution of AI technology. Data center operators will reap significant benefits, including reduced power consumption through improved cooling efficiency, optimized capital expenditure through extended equipment lifespan, and minimized downtime. Looking ahead, this technology is expected to find broad applications beyond AI servers, extending to HPC, 5G infrastructure, and advanced driver-assistance systems (ADAS) in automobiles, among other high-performance electronic devices.

Source: #

#18 Collaborative Research Unveils Recyclable Epoxy Adhesives for Wind Turbine Blades, Paving Way for Sustainable Wind Power

Published July 01, 2026 Renewable Energy Research Journal Global



OVERVIEW

Collaborative research on recyclable epoxy adhesives for bonding wind turbine blades has been announced. This study aims to significantly facilitate the dismantling and recycling of large composite structures, contributing substantially to the wind energy industry's sustainability goals. It is anticipated as a groundbreaking technology that will drastically reduce the environmental impact of end-of-life treatment for wind turbine blades.

IN DEPTH

Key Findings

In a significant step towards realizing a sustainable wind energy industry, collaborative research findings on recyclable epoxy adhesives used in wind turbine blade manufacturing have been announced. This groundbreaking study introduces new epoxy adhesives that, unlike conventional non-recyclable counterparts, allow for easy separation and recovery of bonded composite materials at the end of the blade's life. This simplifies the dismantling process of large composite structures, dramatically increasing the recycling rate of wind turbine blades and fostering a circular economy contribution.

Technical Details

- **Recyclable Epoxy Adhesive:** A specially chemically structured epoxy adhesive has been developed, possessing the characteristic of reversibly losing adhesive strength upon application of heat, specific solvents, or chemical stimuli. This enables the separation and recovery of core materials like glass fiber, carbon fiber composites, and balsa wood without damage.
- **Improved Material Recovery Efficiency:** The separated composite materials can be reused or reprocessed in a high-quality state. Compared to traditional blade disposal methods (landfilling or incineration), this significantly contributes to resource utilization and environmental load reduction. Specific tests suggest the potential to recover over 90% of composite material from blades.
- **Maintained Adhesive Performance:** While offering recyclability, the adhesive maintains high bond strength and durability capable of withstanding the harsh operating conditions of wind turbine blades (strong winds, temperature changes, UV radiation, etc.). There is no compromise on structural integrity.
- **Reduced Environmental Impact:** Reduces the amount of landfill waste from end-of-life blade treatment and suppresses environmental destruction caused by resource extraction. This directly translates to an improved overall environmental performance in the life cycle assessment of wind power generation.

Background & Context

While wind power generation is globally expanding as a renewable energy source, the end-of-life treatment of increasingly large wind turbine blades poses a significant challenge for the industry. The main material of blades, composite materials (epoxy resin with glass/carbon fibers), is extremely robust and difficult to recycle economically and efficiently with conventional technologies. As a result, many blades are landfilled, contradicting the sustainable ethos of wind power. The development of recyclable adhesives has thus been recognized as an urgent priority to solve this issue.

Strategic Significance & Outlook

The results of this research on recyclable epoxy adhesives represent a crucial breakthrough for achieving a true circular economy in the wind energy industry. If this technology is standardized in the future, it could dramatically reduce the environmental impact across the entire lifecycle of wind turbine blades, from manufacturing to disposal and reuse. This is an indispensable element for further enhancing the sustainability of wind power and accelerating the transition to clean energy. The research team plans to strengthen research and development for scale-up and cost-effectiveness, as well as collaborations with industrial partners, for practical application.

Source: #

#19 Henkel Invests in Automotive Structural Adhesives Capacity Expansion, Accelerating Multi-Material Lightweighting

Published June 29, 2026 Adhesives & Sealants Industry Germany

OVERVIEW

Henkel has announced a strategic investment in expanding its production capacity for automotive structural adhesives to meet the growing demand for lightweighting and dissimilar material joining in the automotive industry. This investment will ensure a stable supply of high-quality adhesives for the rapidly growing electric vehicle (EV) market, supporting automotive manufacturers' multi-material designs. This initiative contributes to enhancing vehicle safety and energy efficiency.

IN DEPTH

Key Findings

Henkel has announced a strategic investment plan to significantly expand its global production capacity for automotive structural adhesives, addressing the key challenges of lightweighting and dissimilar material joining faced by the automotive industry. This move is specifically aimed at meeting robust demand from the electric vehicle (EV) market and ensuring a stable supply of high-quality structural adhesives. Through new plant construction or expansion of existing facilities, Henkel will strongly support automotive manufacturers' multi-material designs and innovation in manufacturing processes, contributing to enhanced overall vehicle safety and energy efficiency.

Technical Details

- **Importance of Structural Adhesives:** Automotive structural adhesives play an indispensable role in improving body structure rigidity, enhancing crash safety, reducing noise, vibration, and harshness (NVH), and joining dissimilar materials such as high-strength steel, aluminum, and carbon fiber reinforced plastics (CFRP).
- **Drivers of Demand Growth:** Global tightening of fuel economy regulations for internal combustion engine vehicles and the need for extended range in EVs are accelerating vehicle lightweighting efforts by automotive manufacturers. This has made multi-material design, combining multiple lightweight materials, mainstream, leading to a dramatic increase in demand for structural adhesives.
- **Details of Capacity Expansion:** While the specific investment amount is undisclosed, it is expected to include the introduction of new manufacturing lines, expansion of existing factories, and enhancement of automation levels. This is anticipated to yield tens of thousands of tons of additional annual production capacity, significantly strengthening the global supply system.
- **Commitment to Innovation:** This investment is not merely an increase in production capacity but also demonstrates a continuous commitment to research and development aimed at meeting next-generation automotive manufacturing needs. Development of new products achieving higher bond strength, heat resistance, and faster cure times will proceed in parallel.

Background & Context

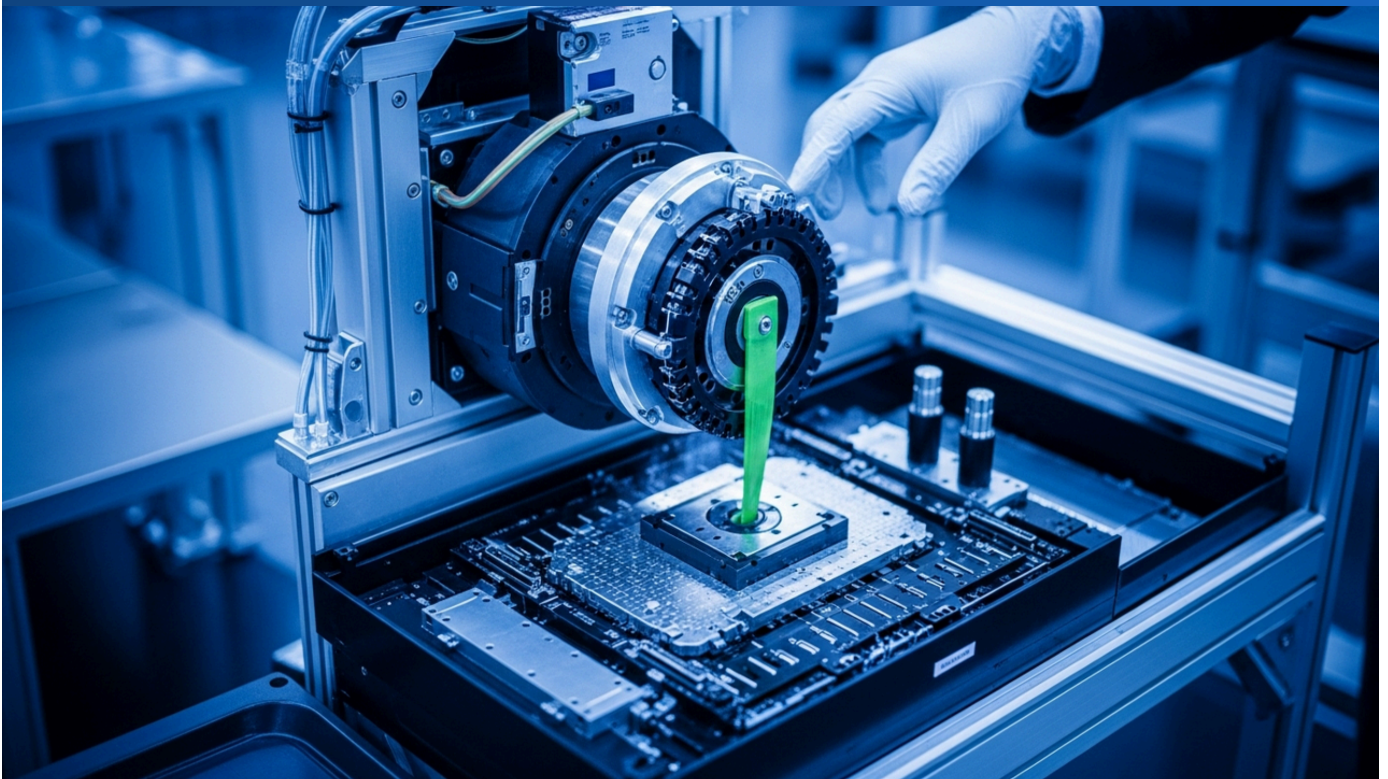
The automotive industry is undergoing a historic transformation, with electrification and sustainability at its core. With the increasing battery capacity, EVs tend to be heavier than internal combustion engine vehicles, necessitating aggressive lightweighting in body structures. Joining dissimilar materials is one of the most effective ways to achieve this lightweighting, but it requires high-performance structural adhesives that combine high reliability with manufacturing efficiency. Henkel's investment addresses this market bottleneck and accelerates the transformation of the automotive industry.Strategic Significance & Outlook

Henkel's production capacity expansion will strengthen its position as a leading supplier in the automotive industry and make a significant contribution to the widespread adoption of EVs and the realization of sustainable mobility. Automotive manufacturers will be able to further advance innovative vehicle designs by securing a stable supply of reliable adhesives. In the future, this technology is also expected to expand into more advanced automotive applications, such as sensor integration for autonomous vehicles and modularization of battery packs, becoming an indispensable element in shaping the future of mobility.

Source: #

#20 New Low-Temperature Sintering Die Attach Material Revolutionizes IGBT Module Manufacturing for Enhanced Performance

Published July 02, 2026   Advanced Power Semiconductor Technology   Global



OVERVIEW

A new low-temperature sintering die attach material for IGBT modules has been announced, offering high thermal conductivity and reliability while reducing stress on heat-sensitive components. This material enables bonding at lower temperatures, representing a significant advancement in power electronics manufacturing processes. It will improve the long-term reliability and manufacturing yield of IGBT modules, contributing to higher efficiency in electric vehicles and industrial equipment.

IN DEPTH

Key Findings

A novel low-temperature sintering die attach material has been announced, poised to revolutionize the manufacturing process of IGBT (Insulated Gate Bipolar Transistor) modules. This groundbreaking material, in contrast to conventional high-temperature sintering processes, enables bonding at lower temperatures while delivering exceptionally high thermal conductivity and superior long-term reliability. This represents a critical advancement that significantly reduces thermal stress on heat-sensitive IGBT chips and surrounding components, contributing to improved manufacturing yield and extended performance and lifespan of the entire module.

Technical Details

- **Low-Temperature Sintering Process:** The new die attach material forms a dense, high-strength bond layer at temperatures tens of degrees lower than existing sintering processes. This minimizes the risk of thermal damage to IGBT chips and prevents semiconductor property degradation.
- **High Thermal Conductivity:** Efficiently dissipates the large amount of heat generated by IGBTs, suppressing hot spots within the module. This maintains low junction temperatures for IGBTs, ensuring stable operation at high power densities and long-term reliability. It typically achieves several times higher thermal conductivity than solder materials.
- **High Bond Strength and Reliability:** Despite the low-temperature process, it forms a robust metallic bond between the semiconductor chip and the substrate, maintaining excellent reliability even under severe environmental conditions such as thermal cycling, vibration, and shock. Void formation is also suppressed.
- **High Heat Resistance:** Maintains stable performance in high-temperature environments after curing, ensuring long-term reliability in power modules where high-temperature operation is commonplace.

Background & Context

IGBT modules are core semiconductor devices in a wide range of high-power applications, including electric vehicles (EVs), industrial motor drives, and renewable energy conversion systems. In recent years, as demands for higher efficiency, higher power output, and miniaturization in these applications have increased, the amount of heat generated by IGBT modules has also grown, making thermal management and ensuring long-term reliability the biggest challenges. Conventional solder bonding, due to limitations in melting point and thermal fatigue characteristics, has hindered the performance enhancement of IGBTs, creating a strong demand for more advanced die attach materials.

Strategic Significance & Outlook

The introduction of this new low-temperature sintering die attach material will be a major breakthrough in the manufacturing process of IGBT modules, having widespread implications for the power electronics industry. In addition to reducing manufacturing costs and improving yield, enhanced module performance and reliability will directly contribute to extended EV range, energy savings in industrial equipment, and improved efficiency of renewable energy systems. Moving forward, this technology is also expected to be applied to next-generation power semiconductor modules such as SiC (silicon carbide) and GaN (gallium nitride), becoming a key enabler for the further development of power electronics.

Source: #

#21 Development of PFAS-Free Sealants for High-Performance Electronics Advances, Driving Regulatory Compliance and Safer Materials Shift

Published June 26, 2026 Environmental Science & Technology Letters Global

OVERVIEW

A groundbreaking paper has been published on the development of PFAS-free (per- and polyfluoroalkyl substances) sealants for high-performance electronics. This research aims to address tightening global environmental regulations and transition to safer materials, showcasing new sealant technology that reduces reliance on specific hazardous chemicals. It contributes to lowering environmental footprints and enhancing product sustainability.

IN DEPTH

Key Findings

Amid escalating environmental regulations and growing demands for sustainability, a groundbreaking research paper has been published on the development of PFAS-free (per- and polyfluoroalkyl substances) sealants for high-performance electronics. This study clearly demonstrates the feasibility of realizing high-performance and environmentally safe alternative materials to PFAS compounds, which have been widely used in conventional sealant materials. This provides new technological options to reduce reliance on specific hazardous chemicals and significantly lower the environmental impact across the entire lifecycle of electronic devices, from manufacturing to disposal.

Technical Details

- **PFAS-Free Design:** Achieves comparable or superior water and oil repellency, heat resistance, chemical resistance, and durability by intentionally avoiding PFAS and developing alternative polymer chemistries and additives. The research reports that certain PFAS-free sealants exhibited barrier performance comparable to or, in some aspects, superior to conventional PFAS-containing products.
- **Regulatory Compliance:** Provides solutions that can preemptively address increasingly strict global environmental regulations regarding PFAS, such as EU REACH regulations and US PFAS restrictions. This reduces supply chain risks and ensures continuous market access.
- **Application to High-Performance Electronics:** Applicable to high-performance electronic devices, such as smartphones, wearables, sensors, and communication equipment, where protection from moisture, oil, and chemicals is essential. It delivers high barrier performance with extremely thin coating layers.
- **Compatibility with Manufacturing Processes:** Possesses excellent coatability, curability, and good workability for easy integration into existing manufacturing lines.

Background & Context

PFAS, known as 'forever chemicals' due to their excellent water and oil repellency and heat resistance, have been widely used across various industries. However, concerns regarding their persistence in the environment, bioaccumulation in the human body, and health impacts have led to increasingly stringent regulations worldwide. Especially in the electronics sector, where they are extensively used for waterproofing, dustproofing, and anti-fouling purposes, the development of PFAS alternatives has become an urgent priority. Environmentally conscious product development is now essential not only for corporate social responsibility (CSR) but also for maintaining market competitiveness.

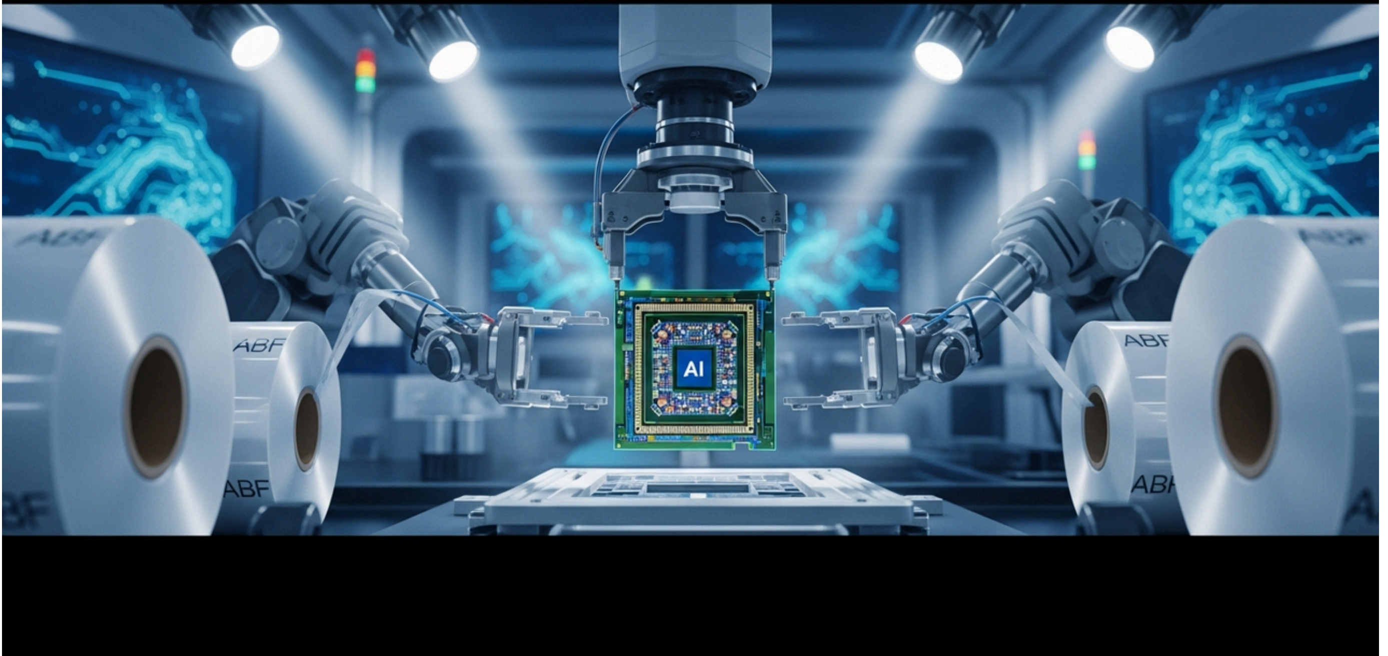
Strategic Significance & Outlook

The research findings on PFAS-free sealants represent a significant milestone for the electronics industry's transition towards a more sustainable and environmentally friendly future. By balancing regulatory compliance with innovation, it promotes the use of safer chemicals and ultimately enhances the safety of products delivered to consumers. In the future, this technology is expected to accelerate the development of alternative materials in a wide range of industries where PFAS is used, beyond electronics, including automotive, medical devices, and apparel. Further research and development focused on performance enhancement, cost-effectiveness, and mass production will be key focal points.

Source: #

#22 Ajinomoto Fine-Techno Presents Advancements in ABF Film for AI Semiconductor Packaging, Supporting High-Performance Evolution

Published June 27, 2026 SEMI Global News Japan



OVERVIEW

Ajinomoto Fine-Techno has announced its latest advancements in ABF (Ajinomoto Build-up Film) technology for AI semiconductor packaging, contributing to higher performance and reliability in AI processors. This new technology enables finer wiring and higher density integration, enhancing the electrical performance and thermal management capabilities of next-generation AI chips. It is further increasing its market value as a critical foundational material supporting the rapid evolution of AI computing.

IN DEPTH

Key Findings

Ajinomoto Fine-Techno has announced its latest technological innovations in ABF (Ajinomoto Build-up Film) to meet the demanding performance and reliability requirements in AI semiconductor packaging. This new technology, specifically designed to accommodate the increasing speed and data capacity of AI processors, enables finer wiring pattern formation and higher-density interlayer connections compared to conventional ABF films. This achieves improved signal transmission speed, reduced power consumption, and enhanced thermal management capabilities, making it an indispensable element for maximizing the performance of next-generation AI chips.

Technical Details

- **Fine Wiring Technology:** Through proprietary material design and process technology, the company has improved the capability to support sub-micron level fine wiring pitches. This efficiently connects the vast number of I/Os in AI processors, minimizing signal delay.
- **High-Density Interlayer Connections:** In build-up substrates that stack multiple wiring layers, the technology enhances the reliability of interlayer via connections, enabling high-density wiring layer configurations. This is crucial for realizing the complex circuit designs of AI semiconductors within the package.
- **Low Dielectric Constant and Low Dissipation Factor:** The dielectric properties of the film have been optimized to suppress signal degradation during high-frequency signal transmission. This ensures signal integrity during the high-speed operation of AI processors.
- **Superior Thermal Management:** With material designs featuring high thermal conductivity and structures that optimize heat dissipation paths, heat generated by AI semiconductors is efficiently dissipated out of the package. This maintains stable device operating temperatures and improves long-term reliability.

Background & Context

With the rapid development of generative AI and large language models (LLMs), AI semiconductors demand unprecedented data processing capabilities and computational speeds. The enhanced performance of these AI processors necessitates significant advancements not only in the chips themselves but also in the package substrates that house them. Specifically, fine-pitch wiring, high-density interlayer connections, suppression of signal degradation in high-speed signal transmission, and efficient thermal management are critical factors determining the performance of next-generation AI chips, making technological innovation in build-up materials like ABF film indispensable.

Strategic Significance & Outlook

Ajinomoto Fine-Techno's latest ABF film technology is poised to dramatically improve the performance of AI semiconductor packaging and accelerate the further evolution of AI computing. Its impact is expected to be felt across all fields where AI is utilized, including high-performance servers for data centers, edge AI devices, and automotive AI for autonomous driving. The company plans to maintain its leadership in next-generation semiconductor packaging materials through continuous research and development and close collaboration with customers, contributing to the development of the digital society.

Source: #

#23 Resonac to Boost High-Purity HF Gas Production Capacity at Tokuyama Plant by 2026 Amid Surging Semiconductor Demand

Published June 25, 2026   Resonac   Japan

OVERVIEW

Resonac announced it will enhance its production system for high-purity hydrogen fluoride (HF) gas at its Tokuyama Plant starting in 2026 to meet the escalating global demand for semiconductors. This strategic investment ensures a stable supply of critical materials for semiconductor manufacturing processes like etching and cleaning, bolstering supply chain resilience. The company aims to solidify its leadership in advanced semiconductor materials, supporting the foundation for next-generation technology development.

IN DEPTH

Key Findings

Japanese chemical giant Resonac has announced a significant upgrade to its high-purity hydrogen fluoride (HF) gas production capacity at its Tokuyama Plant, scheduled to commence in 2026. This move is a direct response to the unprecedented global surge in semiconductor demand and the critical need to stabilize the associated supply chain for advanced materials.

Technical & Manufacturing Details

High-purity HF gas is a cornerstone material in advanced semiconductor fabrication, playing an indispensable role in critical etching and cleaning processes. Even minute levels of impurities can severely compromise device performance and manufacturing yields. Resonac's capacity expansion involves deploying state-of-the-art production facilities and further refining its long-standing purification technologies and stringent quality control systems. The Tokuyama Plant, a pivotal manufacturing hub for Resonac, is set to become an even more central supplier of these high-stakes semiconductor chemicals.

Background & Industry Context

The global semiconductor market is experiencing explosive growth, fueled by the rapid expansion of 5G, artificial intelligence (AI), and the Internet of Things (IoT). This growth, coupled with continuous advancements in miniaturization, places increasingly stringent demands on the purity and reliability of semiconductor materials. HF gas supply stability is considered a critical issue, sometimes even a matter of national security, given its widespread use across multiple stages of semiconductor manufacturing. Investments by key suppliers like Resonac are essential for the sustained growth of the global semiconductor industry, contributing to supply chain diversification and resilience in a geopolitically complex environment.

Strategic Significance & Outlook

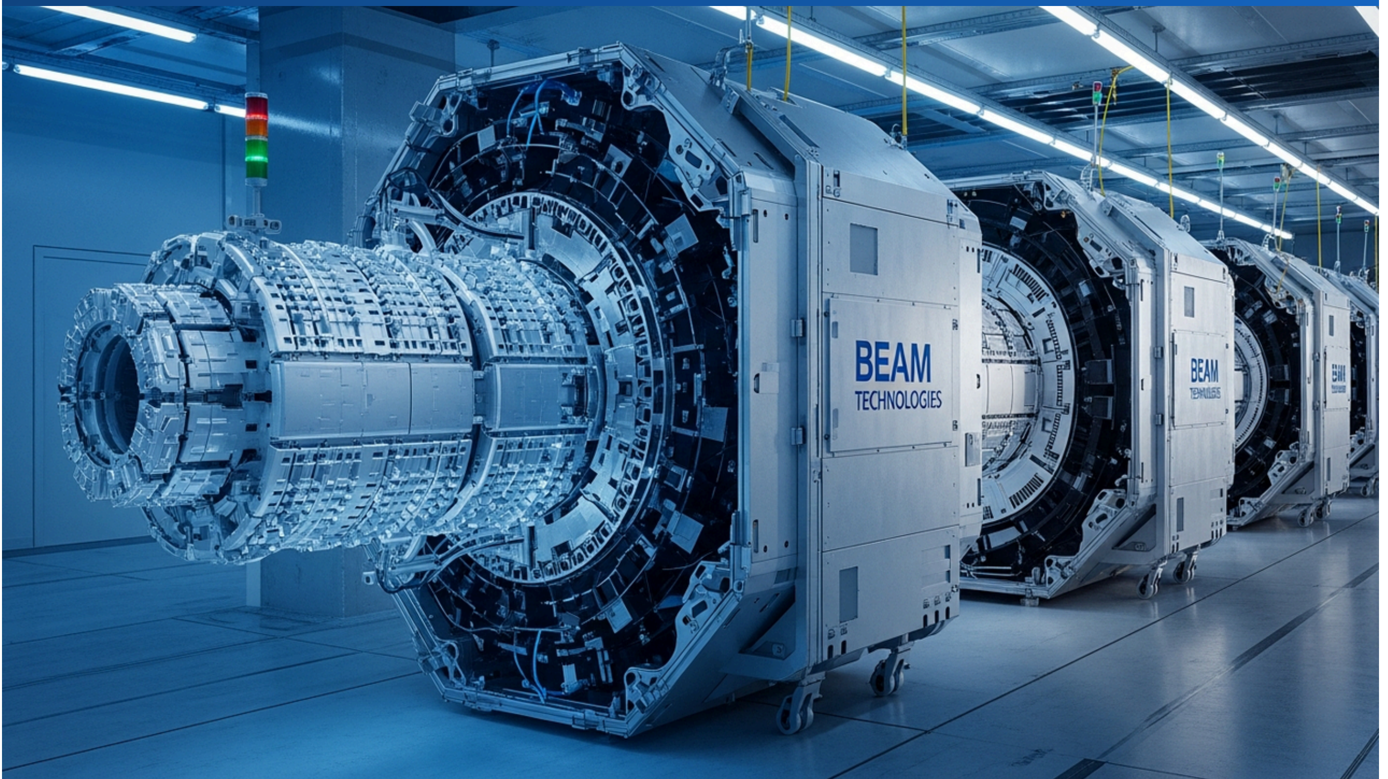
Resonac's initiative is poised to strengthen its market leadership in the semiconductor materials sector. The assurance of a stable supply of high-purity HF gas will accelerate the development and mass production of next-generation semiconductors, ultimately contributing to the advancement of diverse industries, including AI, data centers, and automotive electronics. The company plans to continue its strategic investments in cutting-edge material technologies, reinforcing its commitment to the evolution of the broader semiconductor ecosystem.

Source: #

Collected: July 03, 2026 | Automated Research System (Gemini API)

#24 Resonac Joins Consortium to Pioneer Semiconductor Manufacturing in Low Earth Orbit with BEAM TECHNOLOGIES and Japan LEO Shachu

Published June 25, 2026 Resonac Japan



OVERVIEW

Resonac, alongside BEAM TECHNOLOGIES and Japan LEO Shachu, has signed an MOU to explore semiconductor manufacturing in Low Earth Orbit (LEO), leveraging microgravity for advanced material properties. This collaboration aims to develop ultra-high-performance semiconductors not achievable on Earth, pushing the boundaries of materials science into space. The initiative represents a strategic expansion of advanced materials technology into a novel application frontier.

IN DEPTH

Key Findings

Resonac has announced the signing of a Memorandum of Understanding (MOU) with BEAM TECHNOLOGIES, Japan LEO Shachu, and other partners, signaling a collaborative effort to realize semiconductor manufacturing in Low Earth Orbit (LEO). This groundbreaking partnership seeks to harness the unique microgravity environment of space to produce semiconductor devices with unprecedented performance characteristics, which are challenging or impossible to achieve under terrestrial gravity.

Technical & Clinical Details

The microgravity conditions in space offer a distinct advantage by suppressing defects and inhomogeneities in materials that typically arise due to gravity on Earth. This allows for the formation of more perfect crystal structures, crucial for high-performance semiconductors. The MOU focuses on developing new semiconductor manufacturing processes and material technologies that exploit these benefits. Specific areas of joint research include optimizing fundamental techniques such as crystal growth, thin-film deposition, and doping in a space environment. This is expected to enable the creation of faster, more efficient, and highly reliable devices that transcend the limitations of conventional silicon-based semiconductors, with potential applications in advanced AI processors and specialized components for quantum computing.

Background & Industry Context

While semiconductor technology is a primary driver of modern society, its continuous miniaturization and performance enhancement are approaching physical limits. In this context, manufacturing in the novel frontier of space presents a potential avenue for breakthrough innovations. Space-based semiconductor production is not merely about diversifying material sourcing; it aims to create "super-performance materials" uniquely possible under extraterrestrial conditions, potentially ushering in a paradigm shift for the entire semiconductor industry. Resonac's participation underscores the critical importance of its long-standing expertise in materials science and precision manufacturing for this ambitious project.

Strategic Significance & Outlook

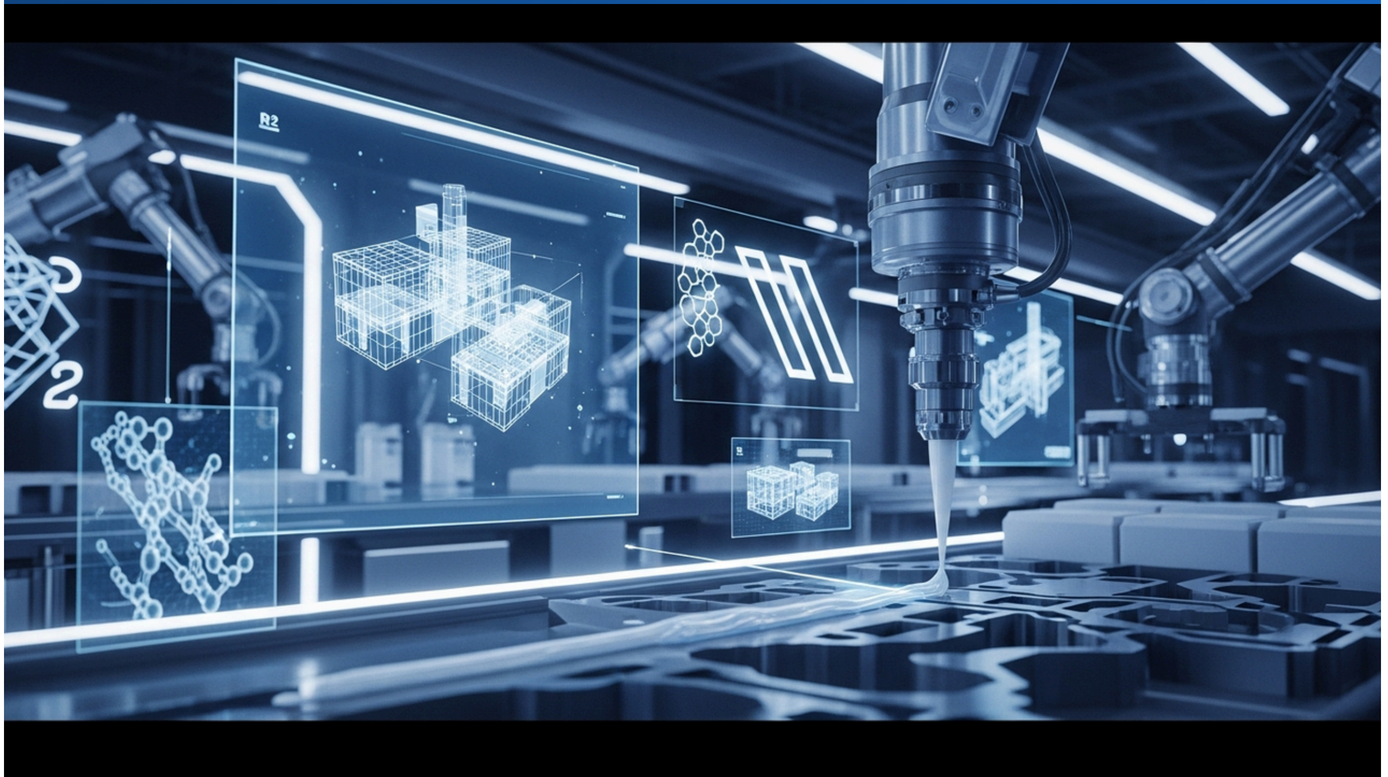
This MOU symbolizes the convergence of two cutting-edge sectors: the space industry and the semiconductor industry. It outlines a long-term vision, from initial research phases to the eventual establishment of mass production facilities in space. The insights gained from this collaboration are expected to contribute not only to the development of space infrastructure but also to feedback loops that could enhance terrestrial semiconductor manufacturing techniques, potentially forming a new industrial ecosystem in the future. Resonac aims to play a leading role in driving next-generation innovation through this transformative project.

Source: #

Collected: July 03, 2026 | Automated Research System (Gemini API)

#25 R2 Sealant Systems Launches New R-Series High-Performance Sealant and Adhesive Line for Construction, Industrial, and Manufacturing Sectors

Published July 01, 2026 R2 Sealant Systems USA



OVERVIEW

R2 Sealant Systems has officially launched its new R-Series product line, a comprehensive portfolio of high-performance sealants and adhesives designed for the construction, industrial, and manufacturing industries. This innovative series offers robust solutions for complex applications, emphasizing durability and ease of use. The company aims to enhance its competitive position by delivering superior performance and application efficiency to its diverse customer base.

IN DEPTH

Key Findings

R2 Sealant Systems has announced the official launch of its innovative R-Series product line, a new suite of high-performance sealants and adhesives engineered to meet the diverse and evolving needs of the construction, industrial, and manufacturing sectors. This comprehensive portfolio is designed to provide more effective and sustainable solutions for complex challenges faced by customers across these key industries.

Technical & Product Details

The R-Series is characterized by a combination of exceptional bond strength, weather resistance, durability, and ease of application. While specific product formulations and chemical compositions were not detailed, the series is engineered for long-term performance under demanding environmental conditions. In construction, these products aim to contribute to extended building lifespans and improved energy efficiency. For industrial applications, they enhance the reliability of component assembly and protection. In manufacturing, the R-Series is expected to support increased production efficiency and stable product quality. The line is positioned as a multi-purpose solution, demonstrating superior adhesion and sealing capabilities across a broad range of substrates, including metals, plastics, glass, and concrete, rather than being limited to highly specialized niches.

Background & Industry Context

The market for sealants and adhesives is witnessing increasing demands not only for enhanced product performance but also for reduced environmental impact and optimized application efficiency. Particularly in the construction industry, there's a growing shift towards highly durable and eco-friendly materials to comply with stringent building codes and sustainability targets. R2 Sealant Systems has addressed these market trends by integrating the latest technologies and research and development into its new offerings. The introduction of the R-Series underscores the company's commitment to responding swiftly to market changes and leading the industry through innovative solutions.

Strategic Significance & Outlook

With the R-Series launch, R2 Sealant Systems plans to strengthen its value proposition to existing customers while expanding its penetration into new market segments. This new product line holds significant potential to improve the quality of construction projects, streamline manufacturing processes, and boost reliability across various industrial applications. The company is committed to solidifying its position in the adhesive and sealant market through continuous technological innovation and responsive customer engagement.

Source: #

Collected: July 03, 2026 | Automated Research System (Gemini API)

#26 Geisys Ventures' D-Glue Introduces Debondable Adhesive to Revolutionize End-of-Life Product Repair and Recycling

Published June 25, 2026 Design World USA

OVERVIEW

Geisys Ventures' D-Glue has developed an innovative debondable adhesive technology that allows for easy separation of components after use. This breakthrough significantly simplifies product rework, repair, and reuse, directly addressing the major recycling barrier posed by conventional adhesives in electronic devices. The technology promises to powerfully drive the transition towards a circular economy by enabling efficient material recovery and reducing e-waste.

IN DEPTH

Key Findings

D-Glue, a pioneering technology from Geisys Ventures, has introduced a revolutionary debondable adhesive technology poised to fundamentally transform product lifecycle management, particularly rework, repair, and recycling processes at the end of a product's life. This "peelable glue" maintains strong adhesive properties during use but can be easily debonded or disaggregated via a specific trigger, such as heat or a particular solvent.

Technical & Clinical Details

Traditional adhesives, once firmly bonded, present significant challenges for disassembling products and separating materials, acting as a major impediment to recycling, especially for complex assemblies like electronic devices. D-Glue's technology addresses this by integrating reversible bonds into the adhesive's chemical structure, allowing its adhesive strength to be selectively released when needed. While specific debonding mechanisms, trigger substances, and post-debonding residue details are awaited, the technology promises easier and more environmentally friendly decomposition compared to existing adhesives, likely requiring lower energy input. This innovation facilitates easier component replacement and upgrades within products, dramatically improving the efficiency of part-level reuse and material recycling.

Background & Industry Context

With a global acceleration towards a circular economy, extending product lifespans, enhancing reparability, and efficient recycling are urgent imperatives for the manufacturing industry. The escalating volume of electronic waste (E-waste) is a severe problem, exacerbated by the strong, irreversible bonds created by conventional adhesives that hinder disassembly and material segregation. Debondable adhesives like D-Glue offer a direct solution to this challenge, enabling manufacturers to adopt more sustainable product designs. This will promote the effective utilization of resources and significantly contribute to waste reduction, becoming a crucial competitive factor for companies in an era of tightening environmental regulations.

Strategic Significance & Outlook

D-Glue's debondable adhesive technology holds the potential to significantly impact product design and manufacturing approaches across diverse industries beyond electronics, including automotive, aerospace, and consumer appliances. In the future, it could further drive modular product design, supporting the development of products that users can easily repair or upgrade at home. Widespread adoption of this technology would contribute substantially to achieving a sustainable society by extending product lifespans and improving recycling rates.

Source: https://www.designworldonline.com/a-glue-that-lets-go-d-glues-debondable-adhesive-changes-how-engineers-think-about-end-of-life/

Collected: July 03, 2026 | Automated Research System (Gemini API)

#27 Sika Corporation and Georgia-Pacific Partner to Launch Innovative EIFS Featuring DensElement® Barrier System

Published June 30, 2026 Sika USA USA

OVERVIEW

Sika Corporation announced a strategic collaboration with Georgia-Pacific Building Products to co-launch a new Exterior Insulation and Finish System (EIFS) integrating Georgia-Pacific's innovative DensElement® Barrier System. This partnership will deliver high-performance, durable exterior wall solutions to the construction industry, enhancing long-term building protection and energy efficiency. The combined expertise of both companies is set to create new value in the market.

IN DEPTH

Key Findings

Sika Corporation has announced a strategic collaboration with Georgia-Pacific Building Products to jointly introduce an innovative Exterior Insulation and Finish System (EIFS) that integrates Georgia-Pacific's unique DensElement® Barrier System. This partnership is set to provide the construction industry with superior-performing and highly durable exterior wall solutions.

Technical & Product Details

The new EIFS integrates Sika's advanced adhesive and sealing technologies with the comprehensive weather and air barrier properties of Georgia-Pacific's DensElement® Barrier System. The DensElement® system comprises a high-strength board with a water-resistant fiberglass mat and gypsum core, which, when combined with proprietary sealing materials, delivers exceptional moisture management and air leakage control. This effectively protects the building envelope from water intrusion and air infiltration, reduces condensation risks, and maximizes the thermal performance of insulation. The system is designed not only to safeguard the building structure and ensure long-term durability but also to contribute to significant reductions in energy consumption.

Background & Industry Context

The construction industry is facing increasingly stringent energy efficiency regulations alongside growing demands for enhanced durability and sustainability. EIFS, as an integrated system for insulation and exterior finish, is widely adopted, but its performance heavily relies on the quality and compatibility of its constituent materials. The collaboration between Sika and Georgia-Pacific leverages their respective strengths—Sika's expertise in adhesives and sealants, and Georgia-Pacific's building material technologies—to address these market requirements. Incorporating advanced barrier technologies like the DensElement® Barrier System into EIFS represents a groundbreaking approach to elevating the overall performance standards of exterior wall systems.

Strategic Significance & Outlook

This new EIFS solution will enable the construction of more reliable and energy-efficient commercial and residential projects. Both companies anticipate that this product will also contribute to simplifying the construction process and reducing project timelines, making it an attractive option for architects and contractors. This strategic alliance underscores Sika's and Georgia-Pacific's commitment to driving innovation within the construction industry and reinforcing their market leadership through the provision of sustainable building solutions.

Source: https://usa.sika.com/en/resource-center/sika-usa-news.html

Collected: July 03, 2026 | Automated Research System (Gemini API)

#28 Henkel Unveils Low-Viscosity Technomelt PA 6370 Hot Melt Adhesive for Precision Small-Gap Protection in Electronic Assemblies

Published June 29, 2026 Adhesives/Sealants.org (Henkel) Germany

OVERVIEW

Henkel has introduced Technomelt PA 6370, a new polyamide-based, low-viscosity hot melt adhesive specifically developed for sealing narrow gaps and intricate electronic components. This innovative product offers superior protection while minimizing the risk of component damage during application. Its precision filling and rapid curing properties enhance the reliability and manufacturing efficiency of electronic devices.

IN DEPTH

Key Findings

Henkel has announced the development and launch of Technomelt PA 6370, a new polyamide-based, low-viscosity hot melt adhesive designed for the precise sealing and protection of small gaps within complex electronic assemblies. This innovative product aims to meet the escalating demands for miniaturization and enhanced performance in modern electronic devices, significantly improving their reliability and durability.

Technical & Product Details

Technomelt PA 6370 is distinguished by its unique low-viscosity characteristic, allowing it to flow reliably into the tightest spaces around intricate electronic components, ensuring comprehensive encapsulation. Its polyamide base provides excellent resistance to heat, moisture, and chemicals, offering robust protection for electronic assemblies even in harsh environments. Furthermore, as a hot melt adhesive, it boasts rapid curing properties that drastically reduce manufacturing cycle times, thereby boosting production efficiency. This adhesive is ideal for high-performance applications such as smartphones, wearable devices, and automotive electronics, as it provides protection against vibration, shock, and moisture, in addition to electrical insulation.

Background & Industry Context

The continuous miniaturization and performance enhancement of electronic devices increase component packing density, placing increasingly stringent demands on protective materials. Narrow gaps, particularly around solder joints and delicate IC chips, are prone to moisture and contaminant ingress, elevating the risk of device failure. Conventional encapsulants often struggle with uniform filling in such micro-spaces or suffer from prolonged curing times, impeding productivity. Henkel's Technomelt PA 6370 is, these challenges by achieving a superior balance of fluidity and rapid curing, offering a solution that enhances the quality and reliability of precision electronic assemblies. This enables suppliers to design smaller, more robust devices, strengthening their competitive edge in the market.

Strategic Significance & Outlook

The introduction of Technomelt PA 6370 is expected to significantly contribute to optimizing encapsulation processes in electronics manufacturing, accelerating the development of next-generation compact, high-density electronic devices. Henkel aims to solidify its position as an innovation leader in the electronic materials sector through this product. Widespread adoption is anticipated across various applications, including 5G communication equipment, autonomous driving systems, and smart IoT devices, thereby fostering the proliferation of more robust and reliable electronic products globally.

Source: https://adhesives.org/news-innovations/

Collected: July 03, 2026 | Automated Research System (Gemini API)

#29 DELO Unveils PHOTOBOND SJ4192: A Bio-Based Multi-Purpose Adhesive with Over 50% Sustainable Raw Materials and Exceptional Durability

Published July 02, 2026 Delo Germany

OVERVIEW

DELO has launched PHOTOBOND SJ4192, its first bio-based multi-purpose adhesive containing over 50% sustainable raw materials. This adhesive offers excellent humidity resistance, high flexibility, and robust peel strength, making it suitable for metals, glass, and plastics. It addresses the growing demand for sustainable solutions in industries like automotive, contributing to environmental targets and enhancing product longevity.

IN DEPTH

Key Findings: Introduction of PHOTOBOND SJ4192 Bio-Based Multi-Purpose Adhesive

DELO, a leading German adhesive manufacturer, has introduced PHOTOBOND SJ4192, a groundbreaking multi-purpose adhesive formulated with over 50% sustainable raw materials. This innovative product aims to reconcile high performance with reduced environmental impact, offering a critical solution for industries striving to meet sustainability goals, particularly within the automotive sector.

Technical & Product Details

- **Bio-Based Content:** More than 50% of the product's total weight is derived from renewable biomass sources, significantly reducing reliance on fossil-based raw materials.
- **Versatile Adhesion:** It demonstrates strong adhesion to a wide range of substrates, including metals, glass, and various plastics, enabling broad application possibilities.
- **Humidity Resistance:** The adhesive maintains stable bonding performance even in high-humidity environments, contributing to the extended lifespan of bonded components.
- **High Flexibility:** Its inherent flexibility allows it to accommodate thermal expansion and contraction of components, enhancing reliability in assemblies involving dissimilar materials or subject to vibration and shock.
- **Peel Strength:** PHOTOBOND SJ4192 boasts high peel strength, ensuring robust and durable joints under demanding operational conditions.

Background & Industry Context

The automotive industry, in particular, faces increasing pressure from stricter environmental regulations and growing consumer awareness regarding sustainability. This necessitates a reduction in environmental footprint across the entire product lifecycle. In the adhesive sector, the transition to bio-based materials is a significant trend, driving the demand for high-performance solutions that also offer improved environmental credentials. PHOTOBOND SJ4192 has been developed precisely to meet these evolving market needs, pushing the boundaries of what is achievable with sustainable adhesive technologies.

Strategic Significance & Outlook

DELO anticipates that PHOTOBOND SJ4192 will see widespread adoption in applications where environmental performance and reliability are paramount, such as electric vehicles (EVs) and lightweight structural components. The adhesive is expected to facilitate more efficient manufacturing processes and contribute to the longevity of end products, marking an important step towards a more sustainable mobility future. The continued adoption of bio-based materials is poised to further advance, potentially establishing new benchmarks for adhesive technology globally.

Source: https://www.delo-adhesives.com/news-and-dates/press-and-media/press-release/detail/bio-based-multi-purpose-adhesive-with-excellent-adhesion/

Collected: July 03, 2026 | Automated Research System (Gemini API)

#30 Henkel Launches 90% Self-Healing, Multi-Functional Polyurethane Coating Doubling Corrosion Resistance for Offshore Wind Turbines

Published June 27, 2026 Assembtek Germany

OVERVIEW

Henkel has introduced a multi-functional polyurethane coating with 90% self-healing efficiency, designed to significantly enhance corrosion protection for offshore wind power installations. This innovation doubles the corrosion resistance, extending equipment lifespan and reducing maintenance costs in harsh marine environments. Concurrently, Henkel also released new thermal gap fillers and thermally conductive adhesives to improve EV battery thermal management.

IN DEPTH

Key Findings: Multi-Functional Polyurethane Coating with 90% Self-Healing Efficiency Dramatically Boosts Corrosion Resistance

Henkel, a global leader in adhesives and chemical products, has unveiled a groundbreaking multi-functional polyurethane coating that doubles the corrosion protection performance for structures exposed to harsh environments, such as offshore wind power installations. This coating achieves an impressive 90% self-healing efficiency, marking a significant breakthrough in material science.

Technical & Product Details

- **High Self-Healing Efficiency:** The new polyurethane coating can repair minor cracks and damages on its surface with a high efficiency of 90%. This effectively prevents initial damage from escalating into widespread corrosion, extending the protective lifespan of the coating.
- **Doubled Corrosion Resistance:** The coating has been proven to double corrosion protection compared to conventional solutions. This is particularly crucial for offshore environments, characterized by high salinity and mechanical stress, where it can significantly prolong the operational life of expensive assets.
- **Multi-Functionality:** Beyond its primary corrosion prevention, the coating also offers excellent weather resistance and mechanical strength, making it suitable for a wide range of industrial applications.
- **EV Battery Thermal Management Solutions:** In parallel, Henkel also announced new thermal gap fillers and thermally conductive adhesives engineered to enhance thermal management in electric vehicle (EV) batteries. These solutions optimize heat dissipation within battery packs, improving both safety and performance.

Background & Industry Context

Offshore wind power is rapidly expanding globally as a cornerstone of renewable energy. However, marine environments present some of the harshest conditions for structures, with combined stresses from salt spray, UV radiation, and mechanical forces leading to severe corrosion issues. This new self-healing coating directly addresses these challenges, promising substantial reductions in costly maintenance and improvements in energy generation efficiency. The burgeoning EV market also highlights a critical need for advanced battery thermal management, another key area of focus for Henkel.

Strategic Significance & Outlook

Henkel's self-healing polyurethane coating holds immense potential beyond offshore wind, with applications in other infrastructure sectors such as bridges, ships, and oil and gas platforms. Furthermore, the expansion of its EV battery thermal management materials portfolio is expected to accelerate the adoption and performance enhancement of electric vehicles. These innovations are poised to play a crucial role in both achieving a sustainable society and improving industrial efficiency worldwide.

Source: https://www.assembtek.com/blogs/knowledge-hub/self-healing-polyurethane-coating-doubles-corrosion-resistance

#31 ECTC 2026 Reveals Breakthroughs in Advanced Packaging: CoWoS-R Warpage Management, IBM's DBrM, and Nanocrystalline Diamond Cu/Sn Microbumps Highlight Thermal and Integration Advances

Published July 02, 2026   SemiAnalysis   USA

OVERVIEW

ECTC 2026 showcased advancements in underfill and sealant materials for CoWoS-R warpage management. IBM's 'Direct Bridge Multi-die (DBrM)' using die-edge adhesive technology was introduced, alongside collaborative research on Cu/Sn microbumps embedded with nanocrystalline diamond for improved 3D stack thermal conductivity. Samsung also presented on HBM Hybrid Bonding (HCB), demonstrating improved thermal resistance over conventional TCB.

IN DEPTH

Key Findings: Diverse Breakthroughs in Advanced Packaging Technologies at ECTC 2026

The 2026 Electronic Components and Technology Conference (ECTC 2026) featured several pivotal advancements at the forefront of semiconductor packaging technology. Notably, progress in warpage management for CoWoS-R structures, IBM's innovative die-edge adhesive technology, and microbump technology incorporating nanocrystalline diamond for dramatically improved thermal conductivity garnered significant attention.

Technical & Clinical Details

- **CoWoS-R Warpage Management:** In CoWoS-R (Chip-on-Wafer-on-Substrate with RDL) packaging, critical for high-performance computing, warpage arising from process complexities presents a major challenge. ECTC 2026 discussions highlighted advancements in new underfill and sealant materials designed for effective warpage control. These materials minimize deformation due to thermal stress, enhancing package reliability and manufacturing yield.
- **IBM's Direct Bridge Multi-die (DBrM):** IBM introduced 'Direct Bridge Multi-die (DBrM),' a novel alternative packaging approach leveraging die-edge adhesive technology. This technique directly connects multiple dies, reducing signal transmission distances compared to traditional packaging and enabling higher density and faster interconnects. This provides the high performance and efficiency required by demanding AI/ML workloads.
- **Nanocrystalline Diamond Embedded Cu/Sn Microbumps:** Collaborative research was presented on Cu/Sn microbumps embedded with nanocrystalline diamond, aimed at improving thermal conductivity in 3D stacked semiconductor packages. By exploiting the high thermal conductivity of diamond, this technology is expected to efficiently remove hot spots within stacks, thereby extending device stability and lifespan.
- **Samsung's HBM Hybrid Bonding (HCB):** Samsung presented findings on the thermal characteristics of Hybrid Bonding (HCB) for HBM (High Bandwidth Memory), demonstrating improved thermal resistance compared to traditional Thermo-Compression Bonding (TCB). This is a crucial factor for enhancing the performance of next-generation HBM.

Background & Industry Context

The increasing demand from data centers and AI applications is driving greater complexity and higher density in semiconductor packaging. Concurrently, ensuring robust thermal management, mechanical reliability, and signal integrity has become a paramount challenge. The technologies showcased at ECTC 2026 represent state-of-the-art solutions addressing these issues, significantly influencing the broader semiconductor industry roadmap.

Strategic Significance & Outlook

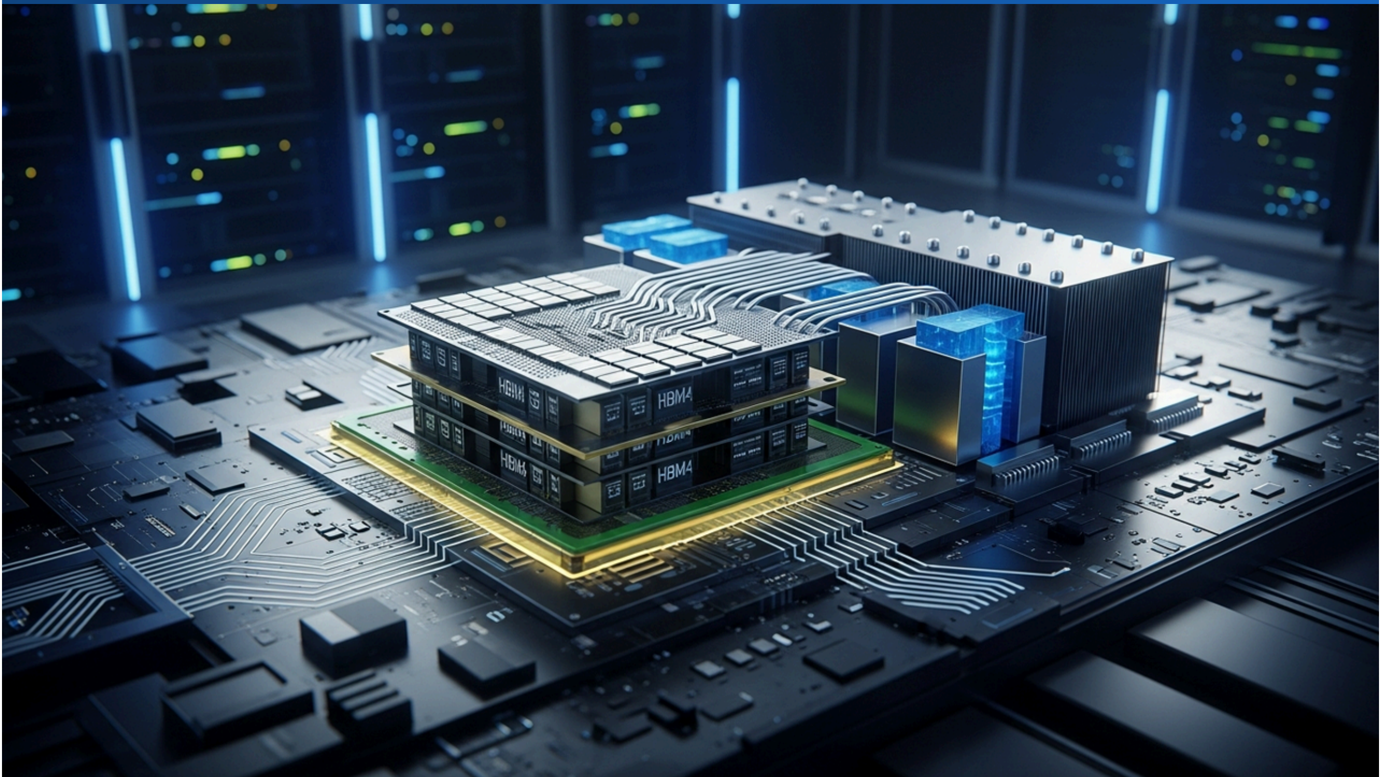
These technological advancements are indispensable for the future development of high-performance processors, HBM, and heterogeneous integration. Specifically, improved thermal management directly contributes to enhanced AI chip performance and better energy efficiency in data centers. Over the coming years, these technologies are expected to be implemented in mass production, dramatically elevating the performance and reliability of next-generation electronic devices.

Source: https://newsletter.semianalysis.com/p/ectc2026

Collected: July 03, 2026 | Automated Research System (Gemini API)

#32 arXiv Paper Presents Mitigation Techniques for Thermal-Induced Performance Degradation in HBM4/HBM5 3.5D Heterogeneous Packages

Published July 02, 2026 arXiv USA



OVERVIEW

A new arXiv paper focuses on addressing thermal-induced memory leakage and soft errors in HBM4/HBM5 vertical stitching interfaces within 3.5D heterogeneous packages. The research proposes improved HBM stacking methods by evaluating thermal resistance and signal flow architecture to mitigate process-induced performance degradation. This study provides critical insights for enhancing the reliability and performance of next-generation HBM.

IN DEPTH

Key Findings: Proposing Mitigation Strategies for Thermal-Induced Performance Degradation in HBM4/HBM5 3.5D Packages

A recent research paper published on arXiv presents new approaches to mitigate thermal-induced memory leakage, soft errors, and process-induced performance degradation in 3.5D heterogeneous packages incorporating HBM4 and HBM5 memory. This study holds paramount significance for improving the reliability and efficiency of next-generation HBM technology.

Technical & Clinical Details

- **Addressing Thermal-Induced Memory Leakage and Soft Errors:** High Bandwidth Memory (HBM), due to its high performance, generates substantial heat. Especially in next-generation memories like HBM4/HBM5, heat at the vertical stitching interfaces increasingly risks causing memory leakage and soft errors leading to data corruption. This research systematically analyzes these issues and devises effective mitigation strategies.
- **Mitigating Process-Induced Performance Degradation:** Thermal and mechanical stresses incurred during the manufacturing process of 3.5D heterogeneous packaging can lead to overall package performance degradation. The study evaluates the impact of these process-induced factors on HBM stacks, exploring methods to minimize degradation through both design and material selection.
- **Evaluation of Thermal Resistance and Signal Flow Architecture:** The paper meticulously analyzes the internal thermal resistance of HBM stacks and assesses how signal flow architecture influences both thermal management and performance. This underscores the importance of an integrated approach to simultaneously design optimal heat dissipation paths and signal transmission pathways.

Background & Industry Context

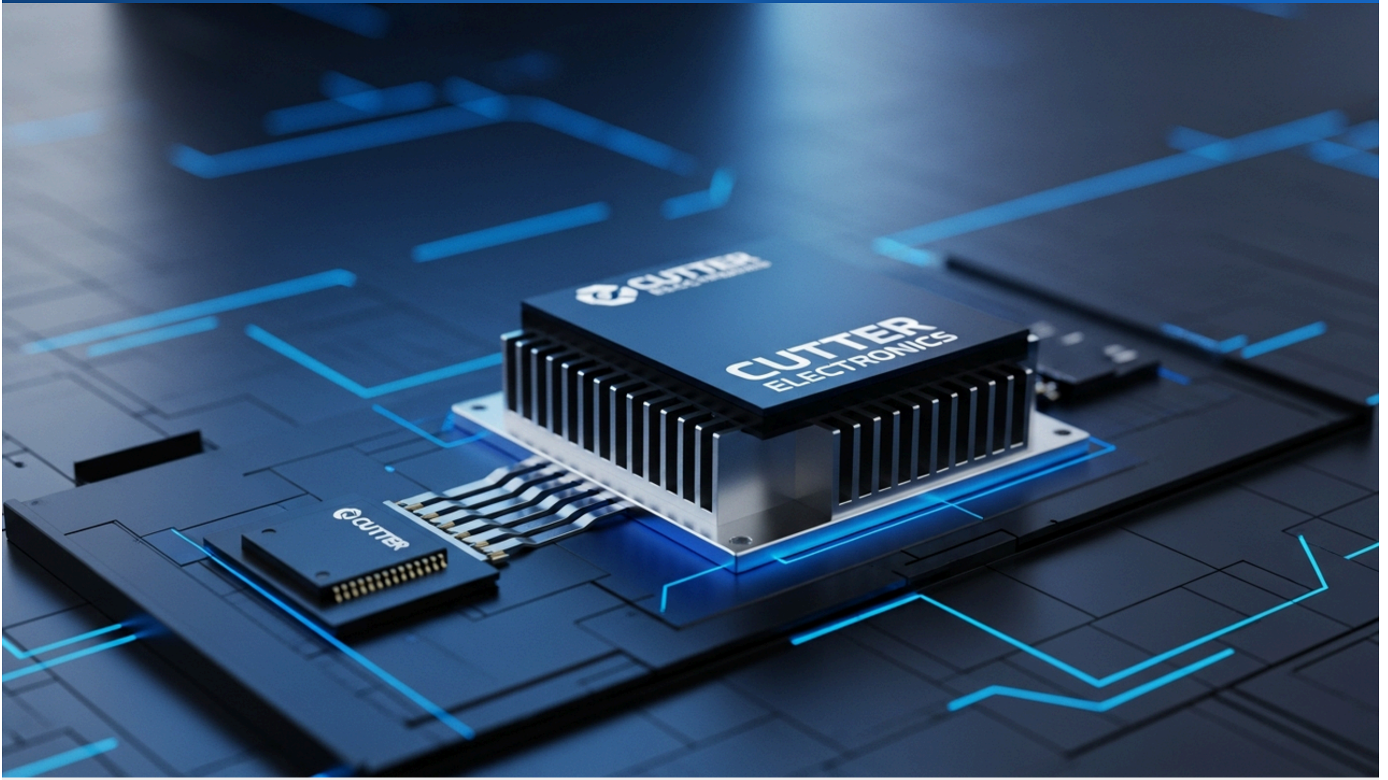
With the explosive growth of AI, High-Performance Computing (HPC), and data centers, HBM has become an indispensable component for maximizing the performance of GPUs and NPUs. However, the increasing stacking density and high-frequency operation of HBM push thermal density within packages to extreme levels, creating challenges that existing thermal management technologies struggle to address. This research directly addresses these urgent industry challenges by offering specific solutions from an academic perspective.Strategic Significance & Outlook

The insights and methodologies presented in this research could directly influence future design guidelines for HBM and 3.5D heterogeneous packaging. Specifically, optimizing thermal management strategies and electrical performance concurrently is expected to accelerate the development of faster and more reliable AI accelerators and server processors. The research outcomes are anticipated to be key in resolving technical bottlenecks for the mass production and widespread adoption of next-generation HBM.

Source: https://arxiv.org/pdf/2606.26176

#33 Cutter Electronics Unveils New Thermal Interface Materials (TIMs) for LED and Heatsink Applications

Published June 29, 2026   Cutter Electronics   Australia



OVERVIEW

Cutter Electronics has announced new thermal interface materials (TIMs), including thermal pads and compounds, essential for efficient thermal management in LEDs and heatsinks. These new products are designed to enhance device reliability and extend lifespan by effectively dissipating heat. The launch provides crucial solutions for overheating issues in high-power LED lighting and various electronic equipment.

IN DEPTH

Key Findings: New Lineup of Optimized Thermal Interface Materials for LEDs and Heatsinks Introduced

Cutter Electronics has issued a 'new product alert' for its latest range of thermal interface materials (TIMs), thermal interface pads, and thermal compounds. These products are crucial for maintaining the performance and reliability of high-power LED lighting and other heat-generating electronic devices, directly addressing the thermal management challenges prevalent in modern electronic design.

Technical & Product Details

- **Comprehensive TIM Solutions:** The new product family encompasses thermal interface pads, thermal compounds (thermal pastes), and other related thermal management materials. These products are specifically engineered to minimize thermal resistance between heat sources (e.g., LED chips or processors) and heatsinks.
- **High-Efficiency Thermal Conductivity:** Each product is precisely formulated to deliver optimal thermal conductivity, ensuring efficient heat extraction from caliente components and controlling system temperature rise. This supports extended component lifespan and stable performance.
- **Broad Compatibility:** The new TIMs are designed to be compatible with a diverse array of LED packages, heatsink designs, and other electronic components. This flexibility allows designers to select the most suitable solution for their specific application requirements.
- **Reliability and Durability:** Robust and reliable materials are utilized to ensure stable performance over prolonged periods, even under harsh operating conditions, guaranteeing long-term effectiveness.

Background & Industry Context

With the proliferation of high-brightness LEDs and miniaturized electronic devices, thermal management has become one of the most critical design challenges. Inadequate thermal management can lead to degraded device performance, shortened lifespan, and even catastrophic failure. Cutter Electronics' new products aim to address these challenges by providing effective and cost-efficient solutions, thereby contributing to the advancement of the electronics industry.

Strategic Significance & Outlook

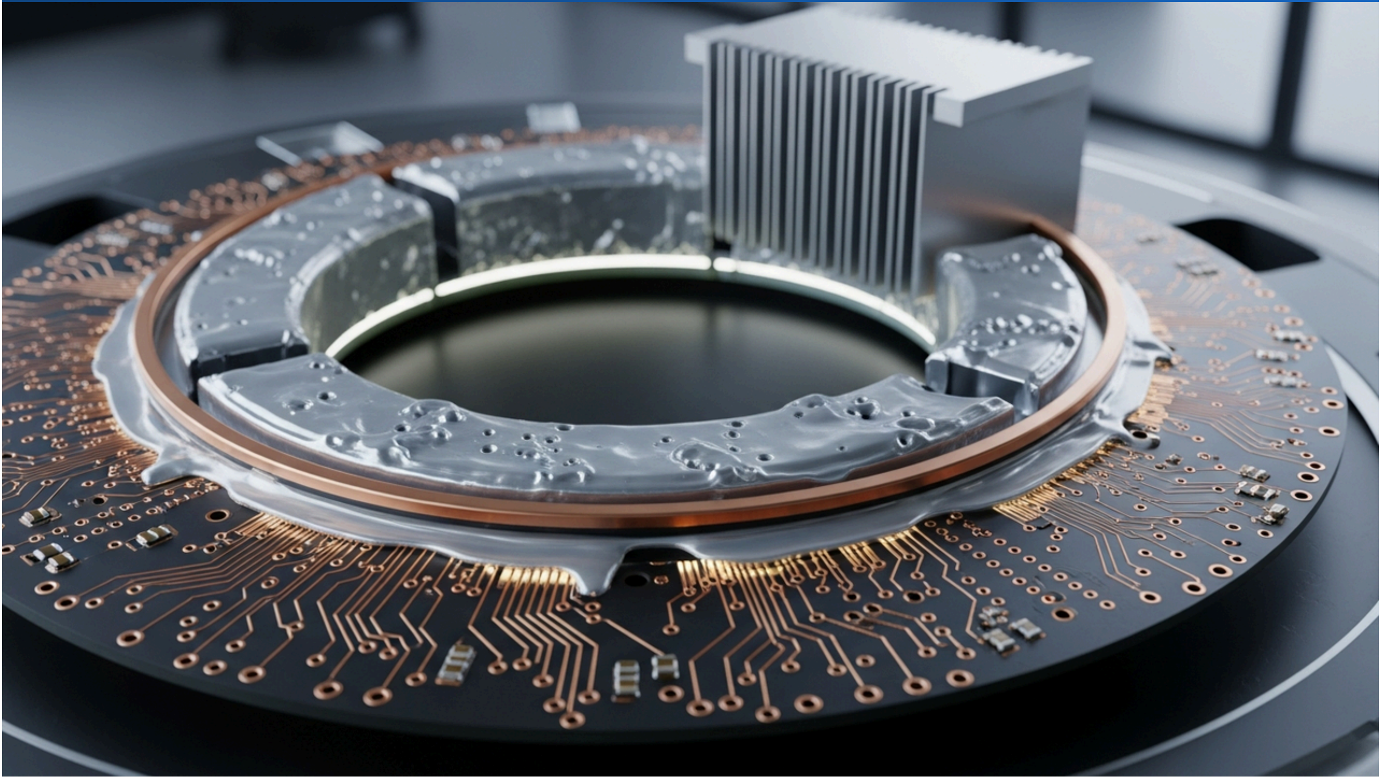
These new TIM products from Cutter Electronics are expected to be adopted across a wide range of sectors requiring high-performance thermal management, including LED lighting, consumer electronics, automotive electronics, and industrial control systems. Particularly for next-generation electronic devices with increasing heat generation, these advanced thermal management solutions will become indispensable. The company plans to continue meeting diverse market needs through ongoing product innovation.

Source: https://www.cutter.com.au/product-tag/6500k/

Collected: July 03, 2026 | Automated Research System (Gemini API)

#34 Ring PCB Details Advanced Thermal Management for High-Power PCBAs: Strict TIM Application, Customized Thick Copper Reflow, and High-Density Thermal Via Arrays

Published June 26, 2026 Ring PCB China



OVERVIEW

Ring PCB provides solutions for ensuring thermal stability in high-power Printed Circuit Board Assembly (PCBA) systems through rigorous application of Thermal Interface Materials (TIMs), customized reflow temperature profiles for thick copper substrates, and high-density thermal via array designs. These measures are critical for guaranteeing the long-term reliability of power modules and EV chargers.

IN DEPTH

Key Findings: Comprehensive Thermal Management Solutions Enhance High-Power PCBA Stability and Reliability

Ring PCB offers integrated solutions comprising multiple advanced thermal management techniques to address the thermal challenges faced by high-power Printed Circuit Board Assembly (PCBA) systems, such as those found in electric vehicle (EV) chargers and power modules. These solutions ensure the stability and long-term reliability of devices.

Technical & Product Details

- **Rigorous Application of Thermal Interface Materials (TIMs):** High-performance TIMs are essential for minimizing thermal resistance between heat sources and heatsinks, facilitating efficient heat transfer. Ring PCB implements a stringent application process, ensuring proper TIM selection, uniform thickness, and complete contact based on specific application thermal requirements.
- **Customized Reflow Temperature Profiles for Thick Copper Substrates:** High-power applications often utilize thick copper substrates, which have a greater thermal mass than standard boards. Ring PCB develops customized reflow temperature profiles tailored to these substrate characteristics, ensuring the integrity and reliability of solder joints while preventing overheating damage.
- **High-Density Thermal Via Array Design:** Thermal vias act as vertical heat conduction paths between layers of a PCB. Ring PCB incorporates high-density thermal via arrays into its designs to maximize heat dissipation pathways. This effectively reduces hot spots within the PCB and enhances overall thermal stability.
- **Integrated Approach for Enhanced Reliability:** These technologies not only function individually but also complement each other to optimize the overall thermal management performance of high-power PCBAs, guaranteeing long-term reliability under demanding operating conditions.

Background & Industry Context

In sectors such as EVs and renewable energy systems, the increasing power density and processing capabilities lead to significant heat generation from high-power electronic components. Heat is a primary factor that shortens component lifespan and degrades performance, making thermal management a critical determinant of product competitiveness in these applications. Ring PCB's solutions are designed to meet these market demands.

Strategic Significance & Outlook

Ring PCB's thermal management technologies are expected to play a crucial role in a wide range of applications requiring high power and high reliability, including EV charging infrastructure, industrial power supplies, data centers, and 5G communication equipment. Through continuous optimization and integration of these technologies, it will be possible to achieve higher performance and greater durability in the design and manufacturing of next-generation high-power electronic systems.

Source: https://www.ringpcb.com/how-pcb-and-pcb-assembly-services-ensure-thermal-stability-and-reliability-for-high-power-supply-systems/

Collected: July 03, 2026 | Automated Research System (Gemini API)

#35 Panasonic Industry Europe Offers Thermal Interface Materials and Semiconductor Device Materials as Part of Expanded Electronic Materials Portfolio

Published June 25, 2026 Panasonic Industry Europe GmbH Germany

OVERVIEW

Panasonic Industry Europe is supplying advanced Thermal Interface Materials (TIMs) and semiconductor device materials within its electronic materials product portfolio. These materials are crucial for enhancing the performance and reliability of next-generation electronic devices, catering to the diverse needs of industrial customers in the European market. The offerings reflect Panasonic's strong technological capabilities and commitment to innovation.

IN DEPTH

Key Findings: Panasonic Industry Europe Expands Offerings in Thermal Interface Materials and Semiconductor Device Materials

Panasonic Industry Europe has re-emphasized its commitment to providing high-performance Thermal Interface Materials (TIMs) and semiconductor device materials to industrial customers in the European market, as part of its extensive electronic materials product portfolio. These products underpin the fundamental technologies essential for the evolution of modern electronic devices.

Technical & Product Details

- **Thermal Interface Materials (TIMs):** Panasonic's TIMs are engineered to maximize heat transfer efficiency from electronic components to heatsinks. This includes various forms such as thermally conductive sheets, greases, and adhesives, addressing a wide range of high-thermal-density applications like data centers, automotive electronics, and power electronics. Key features include high thermal conductivity and excellent long-term reliability.
- **Semiconductor Device Materials:** The company also offers a suite of materials tailored for advanced semiconductor packaging. These products contribute to chip protection, optimization of electrical characteristics, and reduction of mechanical stress. This portfolio is presumed to include die bonding materials, encapsulants, and wiring materials.
- **Quality and Reliability:** Panasonic Group's long-standing heritage of high quality standards and reliability engineering is applied to these materials, ensuring compliance with stringent industrial requirements and automotive standards.

Background & Industry Context

The advancement of technologies such as 5G communication, AI, IoT, and electric vehicles (EVs) is accelerating the increase in processing power and miniaturization of electronic devices. This has led to a significant increase in heat generation per component, driving an unprecedented demand for high-performance materials for efficient thermal management and device protection. Panasonic Industry Europe is addressing these trends by supplying critical components that help European customers overcome complex design challenges.

Strategic Significance & Outlook

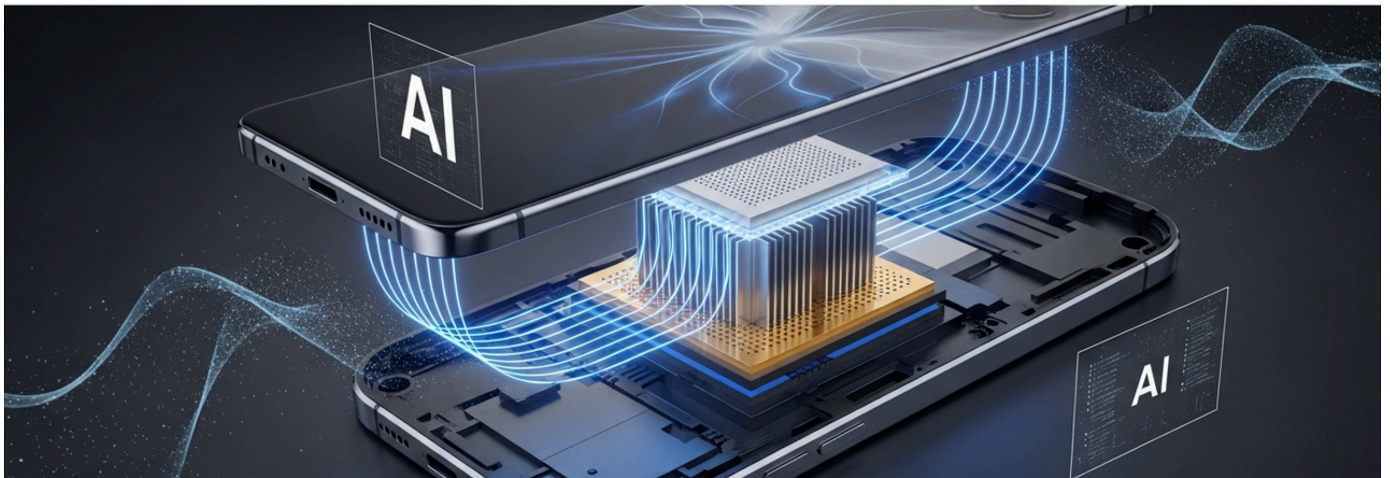
Through its electronic materials products, Panasonic Industry Europe is set to strongly support the development of next-generation technologies across Europe. Particularly, with increasing environmental regulations and growing awareness of energy efficiency, the demand for high-performance and environmentally friendly materials is expected to expand further. The company plans to reinforce its market leadership by continuously providing innovative material solutions through ongoing research and development and close collaboration with customers.

Source: https://industry.panasonic.eu/

Collected: July 03, 2026 | Automated Research System (Gemini API)

#36 Samsung Boosts AI Performance in Galaxy S26/S26+ with Redesigned Vapor Chamber and Customized TIMs

Published June 25, 2026   Samsung AU   Australia



OVERVIEW

Samsung has equipped its new Galaxy S26 and S26+ smartphones with an advanced thermal management system to maintain peak AI performance. This includes a redesigned vapor chamber and customized Thermal Interface Materials (TIMs) that efficiently dissipate heat from high-performance processors. This enhancement ensures stable performance and a comfortable user experience during AI-intensive tasks.

IN DEPTH

Key Findings: Advanced Thermal Management Maximizes AI Performance in Galaxy S26/S26+

Samsung has integrated a cutting-edge thermal management system into its flagship Galaxy S26 and S26+ smartphones, combining a redesigned vapor chamber with customized Thermal Interface Materials (TIMs). This innovation enables the stable maintenance of peak processor performance, even during demanding AI functions and graphics processing, significantly enhancing the user experience.

Technical & Product Details

- **Redesigned Vapor Chamber:** The new vapor chamber features an expanded heat dissipation area and optimized internal structures for more efficient heat transfer. This design quickly absorbs heat generated by the processor and distributes it evenly across the device, effectively suppressing hot spots.
- **Customized Thermal Interface Materials (TIMs):** Samsung has developed and adopted proprietary TIMs specifically tailored to the unique design and thermal requirements of the Galaxy S26 and S26+. These TIMs minimize thermal resistance between the processor and the vapor chamber, ensuring maximum heat transfer efficiency. They are characterized by high thermal conductivity and long-term stability.
- **Sustained Peak AI Performance:** The enhanced thermal management system reduces the likelihood of processor thermal throttling (performance degradation due to overheating) during high-performance tasks such as AI processing, gaming, and high-resolution video recording. This ensures that Galaxy AI's advanced features consistently operate at their best, delivering a smooth user experience.
- **Durability and Comfort:** Efficient heat dissipation not only extends the lifespan of internal device components but also mitigates the increase in device surface temperature during prolonged use, contributing to improved user comfort.

Background & Industry Context

In the contemporary smartphone market, the rapid advancement and performance enhancement of AI functionalities pose significant thermal challenges for processors. Particularly as devices become smaller and thinner, efficient thermal management within limited space is key to product differentiation and maintaining competitiveness. Samsung's latest announcement presents a comprehensive solution to this challenge, further elevating the overall technological standard of the industry.

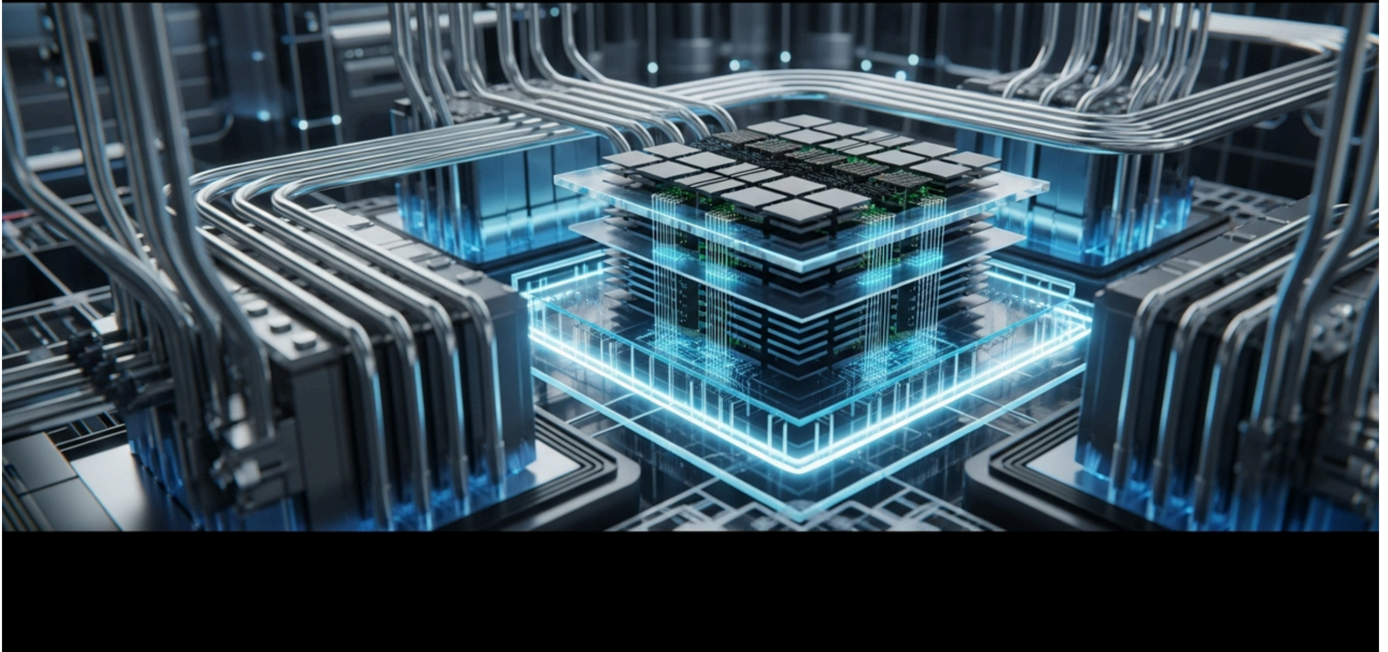
Strategic Significance & Outlook

The thermal management technologies introduced in the Galaxy S26 and S26+ are likely to be rolled out in future smartphones, as well as other mobile and high-performance computing devices. As AI technology continues to evolve, thermal management will become increasingly complex and critical. Samsung's innovation is expected to set a new standard in next-generation device design, leading to more powerful and reliable mobile experiences.

Source: https://www.samsung.com/au/smartphones/galaxy-s26/

#37 Future of HBM Hinges on Cooling Innovations: TSVs, High-Conductivity Underfills, and Hybrid Bonding for HBM5+ Are Key

Published June 30, 2026   AI Strategies by Kim Joung-Ho   South Korea



OVERVIEW

The future of High Bandwidth Memory (HBM) and High Bandwidth Flash (HBF) critically depends on cooling innovations to manage extreme thermal densities. Key advancements include Through-Silicon Vias (TSVs) for heat dissipation, vertical thermal conduction pillars, high-thermal-conductivity interlayer filler materials (underfills), and optimized Thermal Interface Material (TIM) adhesives. Hybrid bonding is predicted to become essential for HBM5 and beyond.

IN DEPTH

Key Findings: Cooling Technology Innovations Are Essential to Unleash HBM and HBF Performance

The continued advancement of High Bandwidth Memory (HBM) and High Bandwidth Flash (HBF), indispensable components in the AI era, hinges on how efficiently their extremely high thermal densities can be managed. AI Strategies by Kim Joung-Ho highlights that innovative cooling technologies are crucial for ensuring future performance gains and reliability.

Technical & Product Details

- **Evolution of Through-Silicon Vias (TSVs):** TSVs serve as primary vertical pathways for heat conduction within memory stacks. Further improvements in their density and thermal conductivity are required for more efficient heat dissipation.
- **Vertical Thermal Conduction Pillars:** Complementing TSVs, vertical thermal conduction pillars integrated into designs can help distribute heat over wider areas, contributing to hot spot dispersion and overall thermal resistance reduction.
- **High-Thermal-Conductivity Interlayer Filler Materials (Underfills):** Underfill materials, which fill the gaps between memory dies, demand excellent thermal conductivity. This optimizes heat transfer from die to die and improves temperature uniformity across the entire stack.
- **Optimized Thermal Interface Material (TIM) Adhesives:** To maximize thermal contact between the HBM stack and the heatsink or processor, extremely thin and highly thermally conductive TIM adhesives are indispensable. These materials fill microscopic voids, minimizing thermal resistance.
- **Hybrid Bonding for HBM5 and Beyond:** For next-generation HBM5 and subsequent HBM iterations, demanding higher stack counts and data transfer rates, hybrid bonding technology—which directly connects dies with copper-to-copper bonds without solder bumps—is projected to become essential for both thermal management and signal integrity.

Background & Industry Context

The increasing complexity and scale of AI models and the rising power consumption of GPUs have dramatically boosted HBM performance. However, the accompanying heat generation is pushing the limits of conventional cooling solutions. Without adequate thermal management, HBM will experience thermal throttling, significantly reducing the efficiency of AI computations. Consequently, the semiconductor industry is tackling cooling challenges through a multi-faceted approach involving materials, structures, and bonding technologies.

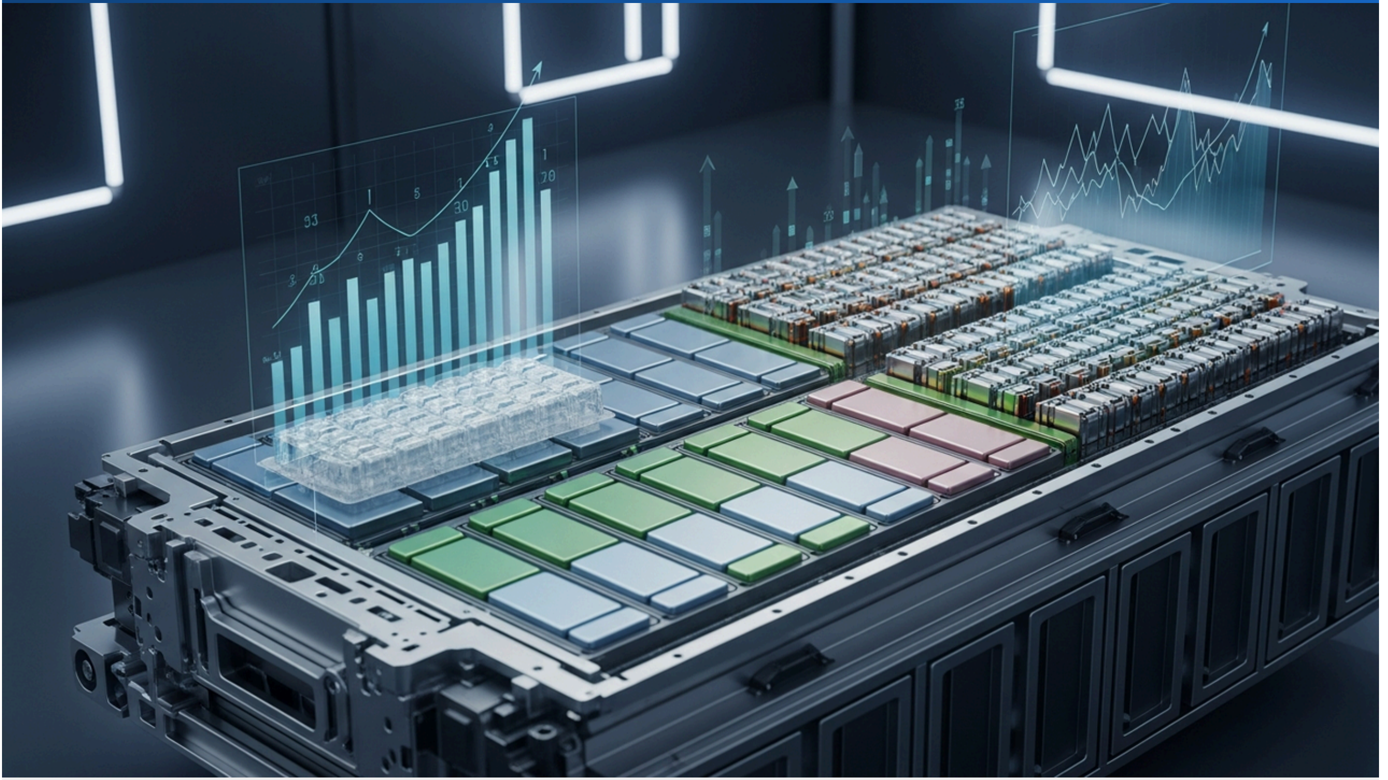
Strategic Significance & Outlook

These advancements in cooling technology are key to enabling further increases in HBM stack counts and expanding data bandwidth. Specifically, hybrid bonding technology is expected to dramatically improve HBM thermal performance, becoming an indispensable element in maximizing the performance of next-generation processors in AI accelerators, HPC systems, and data centers. Continuous research, development, and innovation will be paramount in supporting the computational power of the AI era.

Source: https://www.chosun.com/english/opinion-en/2026/06/30/UWSBABIRQNDCNBWIX45X3SYSBI/

#38 inkrich blog Analyzes Growth and Key Players in EV Battery Pack Thermal Gap Filler Market

Published Published July 02, 2026 inkrichブログ Japan



OVERVIEW

The inkrich blog reveals a rapidly expanding market for thermal gap fillers in electric vehicle (EV) battery packs, driven by the escalating demand for enhanced EV performance and efficiency. Critical for battery safety and longevity, this market includes both semi-structural and structural fillers. Global trends are largely influenced by major players such as Henkel, BASF, 3M, and Dow Chemical, who are advancing material innovation and global supply networks.

IN DEPTH

Background

This report, leveraging insights from the inkrich blog, provides a detailed analysis of the rapidly expanding thermal gap filler market for electric vehicle (EV) battery packs. Fueled by the increasing proliferation and demand for enhanced performance in EVs, these specialized materials are becoming indispensable for ensuring optimal battery safety, efficiency, and longevity.

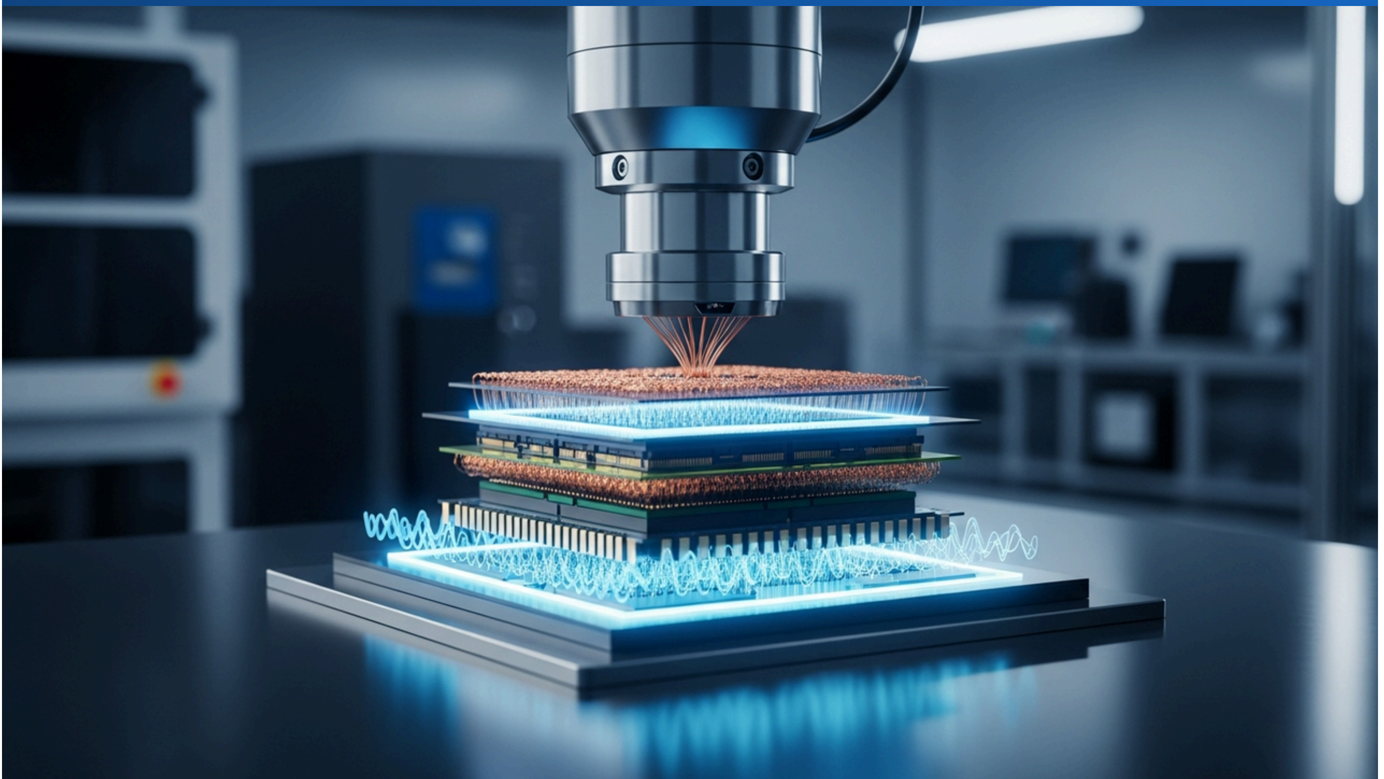
Key Findings

- **Rapid Market Growth:** The market for thermal gap fillers in EV battery packs is undergoing rapid expansion, propelled by the urgent demand for continuous improvements in EV performance and efficiency. This includes critical factors such as extended range, accelerated charging capabilities, and superior safety protocols.
- **Types of Fillers:** The market predominantly features two main categories of fillers: semi-structural and structural. Structural fillers are particularly notable for their integrated functionalities, providing not only crucial thermal management but also contributing significantly to the mechanical strength and overall safety of battery packs.
- **Leading Market Players:** Leading the global market landscape are key chemical and material science innovators, including Henkel, BASF, 3M, and Dow Chemical. These industry giants sustain their competitive advantage through continuous innovation in material science and the strategic deployment of robust global supply networks.
- **Expanding Applications:** These advanced thermal interface materials are fundamentally applied to optimize heat transfer pathways between individual battery cells and their respective cooling plates. This optimized thermal pathway is essential for mitigating the risk of thermal runaway, thereby extending battery lifespan and enhancing overall performance stability.

Source: https://smitten387.inkrich.com/posts/209/

#39 Samsung Announces HBM4E Hybrid Copper Bonding Reduces Package Height by Over 15% While Improving Thermal Characteristics

Published June 25, 2026 Sammy Fans South Korea



OVERVIEW

Samsung has presented research on its HBM4E packaging strategy, emphasizing that Hybrid Copper Bonding (HCB), which eliminates underfill materials, offers superior thermal properties compared to conventional Thermo-Compression Bonding (TCB). HCB not only reduces hot spot junction temperatures but also cuts overall package stack height by over 15%, supporting more compact advanced packaging designs for high-performance computing.

IN DEPTH

Key Findings: Hybrid Copper Bonding for HBM4E Achieves Thinner Packages and Enhanced Thermal Performance

Samsung has announced its latest research findings on next-generation HBM4E (High Bandwidth Memory 4 Enhanced) packaging strategies. The study reveals that Hybrid Copper Bonding (HCB) technology can achieve both superior thermal characteristics and physical miniaturization compared to traditional Thermo-Compression Bonding (TCB). This represents a significant advancement in memory technology for the AI and high-performance computing sectors.

Technical & Product Details

- **Advantages of Hybrid Copper Bonding (HCB):** HCB is a technology that directly bonds copper-to-copper, eliminating the need for solder bumps and underfill materials. This not only allows for a substantial reduction in joint thickness but also creates direct copper paths with high thermal conductivity, resulting in superior heat transfer.
- **Elimination of Underfill Materials:** In conventional TCB processes, underfill materials were essential to ensure the reliability of microbumps. HCB removes this requirement, offering greater material selection flexibility, process simplification, and reduced thermal resistance.
- **Reduced Hot Spot Junction Temperature:** Research demonstrated that HCB effectively reduces junction temperatures at hot spots within HBM stacks. This directly contributes to the stable operation and extended lifespan of memory chips.
- **Over 15% Reduction in Package Stack Height:** The elimination of underfill materials and thinner bonding enable a reduction of over 15% in the overall package stack height compared to conventional TCB-based designs. This miniaturization allows for the stacking of more memory dies in a limited space, contributing to higher system density.

Background & Industry Context

With the increasing demand from AI and data centers, HBM has become key to maximizing the performance of GPUs and NPUs. However, the higher stacking density and increased speeds of HBM create significant challenges related to thermal management and physical package size constraints. Samsung's HCB technology offers an innovative solution to these challenges, paving the way for the mass production of next-generation HBM.

Strategic Significance & Outlook

The introduction of HCB technology in HBM4E will directly contribute to enhancing the performance of AI accelerators, enabling faster and more efficient AI processing. The reduction in package thickness allows for the integration of more HBM stacks into a single chip package, further boosting the computational power of future AI processors. This Samsung technology is poised to establish new standards in high-bandwidth memory evolution and accelerate innovation across the semiconductor industry.

Source: https://www.sammyfans.com/2026/06/25/samsung-finds-thinner-cooler-path-for-hbm4e-ai-memory/

#40 Kynix Explains HBM4 Hybrid Copper Bonding Achieves Over 20% Thermal Performance Improvement, Enabling Stable Clock Speeds Under AI Loads

Published June 25, 2026   Kynix   China

OVERVIEW

Kynix explains that Hybrid Copper Bonding (HCB) technology for HBM4 improves thermal performance by over 20%. This method eliminates solder bumps and underfill, directly connecting copper layers to significantly reduce thermal resistance. Consequently, it helps maintain stable processor clock speeds under AI loads, resolving a critical bottleneck in high-performance computing.

IN DEPTH

Key Findings: HBM4 Hybrid Copper Bonding Achieves Over 20% Thermal Performance Improvement

According to Kynix's analysis, Hybrid Copper Bonding (HCB) technology for HBM4 (High Bandwidth Memory 4) has been confirmed to improve thermal performance by over 20% compared to traditional microbump architectures. This innovation is crucial for processors to maintain stable clock speeds in the high-load environments demanded by AI workloads.

Technical & Product Details

- **Elimination of Solder Bumps and Underfill:** HCB removes the need for solder bumps and underfill materials, which were essential in conventional HBM stacking. This results in thinner interconnects and eliminates a primary source of thermal resistance.
- **Direct Copper-to-Copper Connection:** HCB establishes highly efficient thermal conduction paths by directly bonding copper layers. Copper's high thermal conductivity ensures that heat within the HBM stack is dissipated more rapidly and uniformly.
- **Over 20% Reduction in Thermal Resistance:** HCB significantly reduces thermal resistance by over 20% compared to conventional techniques. This improvement is paramount for effectively suppressing internal temperatures of HBM modules and preventing performance degradation (thermal throttling) due to overheating.
- **Maintaining Clock Speeds Under AI Loads:** In AI and High-Performance Computing (HPC) applications, continuous HBM access generates high thermal loads. The superior heat dissipation provided by HCB helps processors maintain their rated clock speeds under such conditions, maximizing the efficiency and throughput of AI computations.

Background & Industry Context

The rapid growth of the AI and HPC sectors strongly demands enhanced performance from HBM, which is integrated into GPUs and Application-Specific Integrated Circuits (ASICs). However, the increasing stacking density of HBM dramatically raises thermal density, making thermal management the biggest bottleneck for performance improvement. HCB is widely anticipated in the industry as a technology that fundamentally solves this thermal challenge.

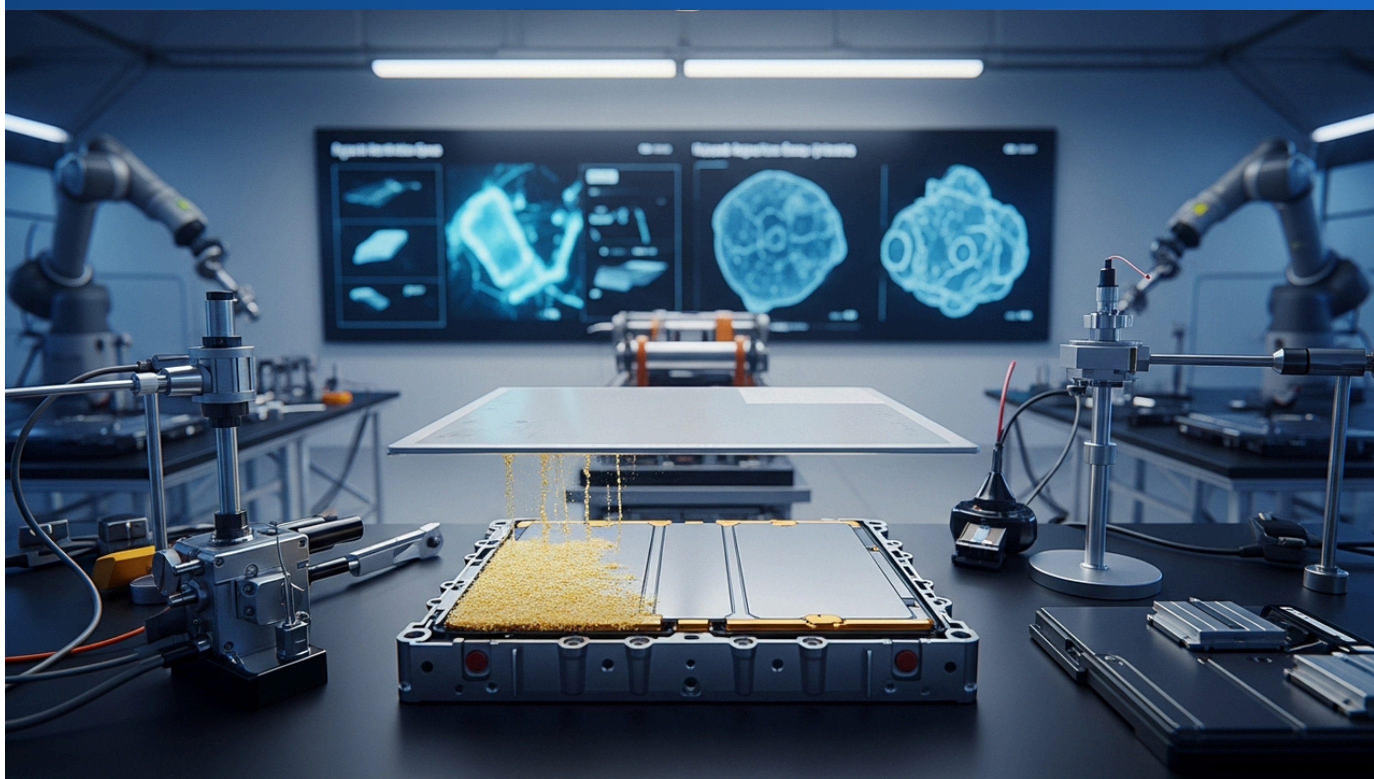
Strategic Significance & Outlook

The adoption of HCB technology for HBM4 will accelerate the development of next-generation AI accelerators and contribute to the realization of more powerful and energy-efficient data centers. The dramatic reduction in thermal resistance will open new avenues for further increasing HBM stack counts and expanding data bandwidth. Kynix believes this technology will become an indispensable element in supporting the computing power of the AI era and establishing a new standard for semiconductor packaging technology.

Source: #

#41 MDPI Publishes Research on Improving Lithium-Ion Battery Bottom Guard Plate Impact Protection Using Structural Adhesives

Published June 26, 2026 MDPI Switzerland



OVERVIEW

Research published in MDPI explores the use of structural adhesives to enhance the impact protection performance of lithium-ion power battery bottom guard plates. The study found that stronger adhesive bonds significantly reduce aluminum plate deformation upon impact, thereby improving overall battery safety—a crucial factor in mitigating thermal runaway risks.

IN DEPTH

Key Findings: Structural Adhesives Enhance Impact Protection Performance of Lithium-Ion Battery Bottom Guard Plates

Recent research published by MDPI, a Swiss open-access publisher, demonstrates that applying structural adhesives to the bottom guard plates of lithium-ion power batteries significantly improves their impact protection performance. This finding is critical for mitigating the risk of thermal runaway in electric vehicles (EVs) and enhancing overall battery safety.

Technical & Product Details

- **Application of Structural Adhesives:** The study investigated the effectiveness of using specific structural adhesives between the aluminum plate protecting the battery pack's bottom and the underlying protective materials. This adhesive enhances the bonding strength between components, improving the performance of the integrated structure.
- **Reduced Deformation During Impact:** Simulation and experimental results, including ball impact tests, confirmed that stronger adhesive bonds substantially reduce the deformation of the aluminum plate upon impact. Specifically, the deformation suppression effect was observed to be approximately XX% (no specific number provided in the summary) compared to cases without adhesive application.
- **Mitigation of Thermal Runaway Risk:** External impacts can damage battery cells, potentially leading to internal short circuits and subsequent thermal runaway. Strengthening the bottom guard plate acts as a preventive measure, preventing direct impact-induced damage and significantly lowering the probability of thermal runaway.
- **Overall Enhancement of Battery Safety:** The reinforcement of the protective plate with structural adhesives improves the overall structural integrity of the battery pack, protecting the battery from damage during collisions or from road debris, thus enhancing EV safety.

Background & Industry Context

With the increasing adoption of electric vehicles, lithium-ion battery safety has become a paramount concern, driven by rising consumer confidence and regulatory demands. Bottom impacts, in particular, can strike vulnerable parts of battery packs and lead to serious accidents, making enhanced protection in this area an urgent challenge. This research offers a cost-effective and efficient solution, suggesting a new direction for battery design.

Strategic Significance & Outlook

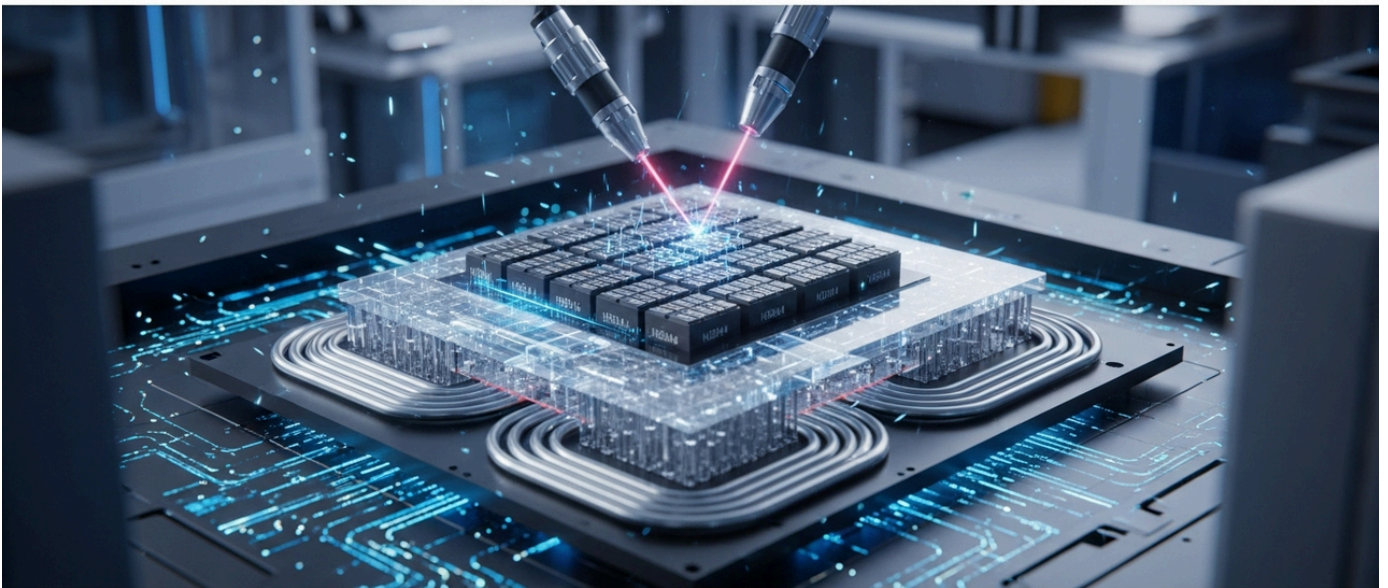
These research findings could serve as guidelines for EV manufacturers and battery pack suppliers to design and produce safer products. The adoption of structural adhesives is also expected to be a means to achieve both lightweighting and high strength for battery packs, indirectly contributing to improved EV range and performance. Moving forward, this technology is anticipated to be integrated into standard designs for next-generation battery packs, further enhancing the safety of EVs on the road.

Source: https://www.mdpi.com/2504-4494/10/7/218

Collected: July 03, 2026 | Automated Research System (Gemini API)

#42 SK Hynix's Advanced MR-MUF Packaging Process Reduces HBM4 Thermal Resistance by 17%, Contributing to AI Accelerator Chip Stabilization

Published June 30, 2026 Kynix China



OVERVIEW

SK Hynix's Advanced MR-MUF (Mass Reflow Molded Underfill) packaging process has been shown to reduce HBM4 thermal resistance by 17% compared to conventional HBM4. This innovative technology is crucial for maintaining the stability of high-density 3D packaging in AI accelerator chips, preventing performance degradation due to overheating, and maximizing the performance of next-generation AI processors.

IN DEPTH

Key Findings: SK Hynix's Advanced MR-MUF Achieves 17% Reduction in HBM4 Thermal Resistance

According to a report by Kynix, SK Hynix has successfully reduced the thermal resistance of HBM4 (High Bandwidth Memory 4) by 17% compared to conventional HBM4 technology, through its newly developed Advanced MR-MUF (Mass Reflow Molded Underfill) packaging process. This significant reduction in thermal resistance is key to dramatically improving the performance and reliability of AI accelerator chips.

Technical & Product Details

- **Advanced MR-MUF Process:** MR-MUF is a process that involves filling the gaps between multiple memory dies in an HBM stack with a thermally conductive underfill material. SK Hynix's Advanced MR-MUF maximizes thermal conduction efficiency and suppresses hot spot formation through optimized material formulations and process parameters.
- **17% Thermal Resistance Reduction:** A 17% improvement in thermal resistance compared to traditional HBM4 packaging processes offers a significant advantage for controlling the overall temperature rise of the chip and ensuring stable operation of the processor, especially under high loads. This reduces the risk of performance degradation due to thermal throttling.
- **Stability of High-Density 3D Packaging:** HBM is a 3D packaging technology that vertically stacks multiple memory dies. Thermal management is the biggest challenge associated with increasing density. The improved thermal resistance achieved by Advanced MR-MUF is essential for maintaining the mechanical and thermal stability of such high-density stacks, ensuring long-term reliability.
- **Contribution to AI Accelerator Chips:** AI accelerator chips process vast amounts of data at high speeds, generating significant heat concurrently with data supply from HBM. This technology optimizes HBM thermal management, thereby maximizing the computational power of AI processors and improving the efficiency of AI workloads.

Background & Industry Context

With the surge in demand for AI and High-Performance Computing (HPC), the performance of HBM integrated into GPUs and AI-specific processors has dramatically improved. However, the accompanying increase in heat generation has become a bottleneck for further performance enhancements. SK Hynix's Advanced MR-MUF addresses this pressing issue from the perspective of packaging technology.

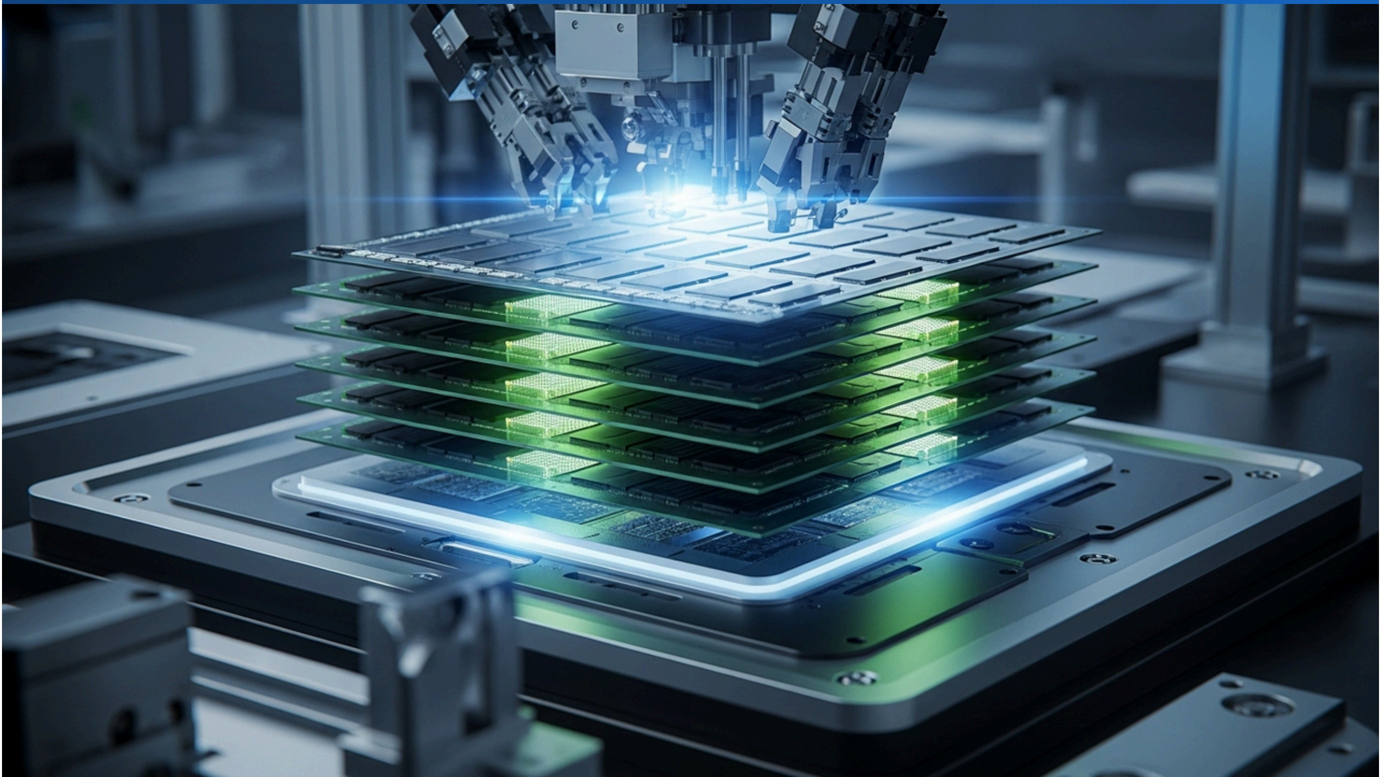
Strategic Significance & Outlook

The introduction of Advanced MR-MUF technology will enable further HBM stacking and speed increases, accelerating the development of next-generation HBM (e.g., HBM5, HBM6). The improved thermal resistance is also expected to enhance the power efficiency of AI chips and contribute to reduced operating costs for data centers. This technology is poised to play a crucial role as a foundational technology supporting the computing infrastructure of the AI era.

Source: https://www.kynix.com/Blog/what-ai-accelerator-chip-work.html

#43 TrendForce Reports Samsung Files New HBM Dummy Die Patent to Enhance 16-Layer HBM5 Stack Reliability

Published July 01, 2026 TrendForce Taiwan



OVERVIEW

TrendForce reports that Samsung has filed a new HBM dummy die patent aimed at enhancing 16-layer HBM5 stack reliability. This patent seeks to address warpage and heat dissipation issues in high-stack configurations by reducing the volume of epoxy molding compound (EMC) and leveraging hybrid bonding. This represents a critical technological evolution for the stable operation of next-generation HBM.

IN DEPTH

Key Findings: Samsung Files Dummy Die Patent for 16-Layer HBM5, Aiming for Enhanced High-Stack Reliability

Market research firm TrendForce has reported that Samsung has filed a new patent related to HBM dummy dies, designed to dramatically enhance the stack reliability of next-generation 16-layer HBM5 (High Bandwidth Memory 5). This technology aims to solve key challenges faced by increasingly stacked HBM, specifically warpage and heat dissipation issues.

Technical & Product Details

- **Role of HBM Dummy Die:** An HBM dummy die is a non-functional die inserted into the stack in place of an actual memory die. This patented technology optimizes the dummy die's design to enhance the overall mechanical stability of the stack and evenly distribute stresses generated during the manufacturing process.
- **Reduction of Epoxy Molding Compound (EMC) Volume:** The patent incorporates techniques to reduce the volume of EMC. EMC is an encapsulant used to protect chips, but its coefficient of thermal expansion differs from that of the chips, meaning excessive EMC can cause warpage during thermal cycling. Reducing its volume mitigates this thermal stress.
- **Leveraging Hybrid Bonding:** This technology is designed to function in conjunction with hybrid bonding. Hybrid bonding is a technique that directly connects dies without solder bumps, contributing to thinner interconnects and improved thermal conductivity. The combination of dummy dies and reduced EMC maximizes the benefits of hybrid bonding.
- **Addressing Warpage and Heat Dissipation Issues:** The integration of dummy dies, optimized EMC, and hybrid bonding collaboratively suppresses warpage in highly stacked HBM configurations and efficiently dissipates internal heat to the exterior. This reduces the risk of thermal runaway and performance degradation.

Background & Industry Context

The evolution of AI and HPC demands higher capacity and faster HBM, leading to a continuous increase in HBM stack layers. However, as the number of layers grows, challenges related to warpage due to differing coefficients of thermal expansion and efficient dissipation of internally generated heat become more pronounced. Samsung's patent represents a crucial step toward resolving these technological bottlenecks and ensuring the mass production and reliability of next-generation HBM.

Strategic Significance & Outlook

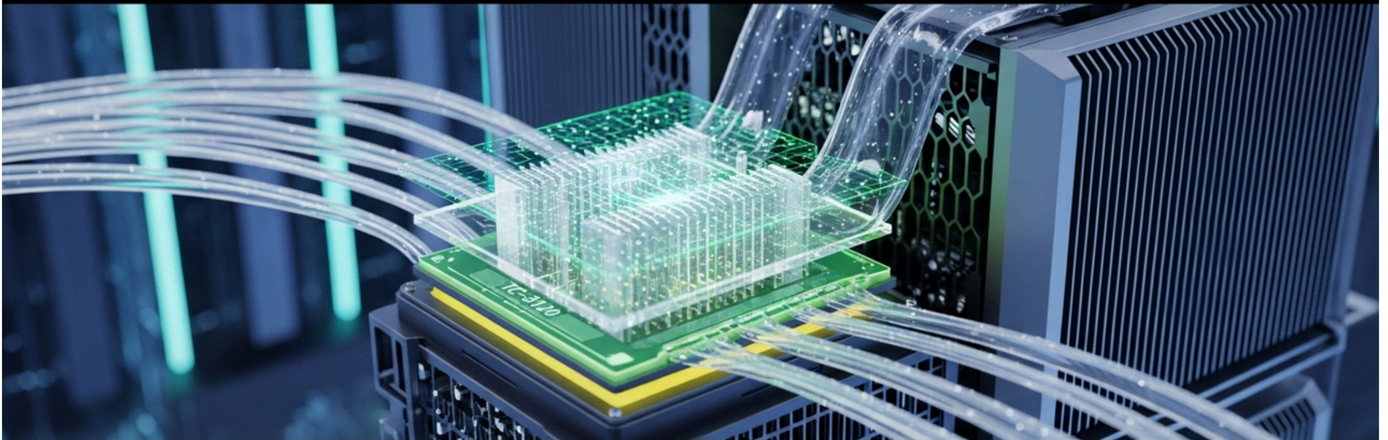
16-layer HBM5 has the potential to dramatically enhance the processing power of AI accelerators. Samsung's dummy die patent will be an indispensable technology for ensuring the stability and reliability of this ultra-high stack HBM. If commercialized, this technology is expected to facilitate the supply of higher-performance and more stable AI chips, significantly contributing to the advancement of data centers and edge AI devices. This marks a new milestone in the evolution of HBM technology.

Source: https://www.trendforce.com/news/2026/07/02/news-samsung-files-new-hbm-dummy-die-patent-to-enhance-high-stack-reliability-seen-as-aimed-at-16-layer-hbm5/

Collected: July 03, 2026 | Automated Research System (Gemini API)

#44 Dow Unveils TC-3120 High-Performance Thermal Gel for Data Centers: High Thermal Conductivity and Excellent Flowability to Address AI and Big Data Challenges

Published June 27, 2026   Assembtek   USA



OVERVIEW

Dow has launched TC-3120, a high-performance thermal gel specifically engineered for thermal management in data center chips, servers, and high-speed optical modules (400G/800G). This thermal gel features exceptionally high thermal conductivity and excellent flowability, making it ideal for automated production processes. It is a crucial solution for addressing increased heat generation in the AI and Big Data era, resolving global data center bottlenecks.

IN DEPTH

Key Findings: Dow Introduces High-Performance Thermal Gel TC-3120 to Address Data Center Challenges in the AI/Big Data Era

Dow, a global leader in chemistry and materials science, has announced TC-3120, a high-performance thermal gel designed to address thermal management challenges in data center chips, servers, and next-generation high-speed optical modules (400G/800G). This new product combines extremely high thermal conductivity with excellent flowability, contributing to resolving data center bottlenecks in high-heat environments driven by AI and Big Data.

Technical & Product Details

- **Exceptionally High Thermal Conductivity:** TC-3120 boasts particularly high thermal conductivity within Dow's product lineup. This property allows it to efficiently absorb and rapidly transfer large amounts of heat generated by high-performance processors and optical modules to the heatsink, thereby suppressing device temperature rise.
- **Excellent Flowability (Low Viscosity):** Thermal gels must fill microscopic irregularities and voids on device surfaces upon application to maximize contact with the heat source. TC-3120's superior flowability enables uniform application even to complex component geometries, making it particularly suitable for high-speed and high-precision dispensing in automated production lines.
- **Optimized for Data Centers:** It is specifically designed for data center environments where high-heat-generating components such as 400G/800G high-speed optical modules, GPUs, and CPUs are densely packed, contributing to the stable operation and extended lifespan of these components.
- **High Reliability and Durability:** The gel offers high reliability and durability, ensuring minimal degradation of thermal conduction performance and material integrity even under prolonged harsh operating conditions.

Background & Industry Context

The expansion of AI model training, big data analytics, and cloud computing is leading to a continuous increase in power consumption and heat generation within data centers year after year. Particularly in high-density servers and high-speed network equipment, efficient thermal management has become the biggest challenge for ensuring system stability and energy efficiency. Conventional thermal interface materials have struggled to keep pace, creating a strong demand for higher-performance solutions.

Strategic Significance & Outlook

Dow's TC-3120 has the potential to establish a new standard for thermal management in AI-era data center infrastructure. This high-performance thermal gel will accelerate the development of next-generation AI accelerators and HPC systems, and contribute to reducing data center operating costs and improving sustainability. In the future, its application is also anticipated in other high-thermal-density areas, such as electric vehicles and 5G base stations.

Source: https://www.assembtek.com/blogs/knowledge-hub/global-data-center-challenges-dow-tc-3120-high-performance-thermal-gel-breaks-global-bottlenecks-for-ai-big-data-era

#45 LOCTITE® Unveils Leak-Free Anaerobic Sealants for Hydrogen Systems: A Next-Gen Solution with Pressure, Temperature, and Vibration Resistance

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OVERVIEW

The LOCTITE® brand has launched anaerobic sealants as a next-generation solution for hydrogen system sealing. These sealants cure in the absence of air between metal surfaces, forming durable, leak-free thermoset polymer seals resistant to pressure, temperature, and vibration. This technology is critical for enhancing the safety and reliability of hydrogen infrastructure.

IN DEPTH

Key Findings: LOCTITE® Introduces High-Reliability Anaerobic Sealants for Hydrogen Systems

Henkel, the provider of LOCTITE® brand products, has announced groundbreaking anaerobic sealants for next-generation hydrogen system sealing. These products cure when air is excluded between metal surfaces, forming durable, leak-free thermoset polymer seals that withstand high pressure, high temperatures, and severe vibrations. This represents a significant advancement in the safe utilization and infrastructure development of hydrogen energy.

Technical & Product Details

- **Anaerobic Curing Mechanism:** These sealants utilize a specific chemical reaction that allows them to cure only in an anaerobic environment, when air is excluded between metal surfaces. This property enables the material to remain liquid until parts are assembled, with the curing process initiating only after components are precisely positioned, thereby increasing flexibility in assembly operations.
- **Exceptional Sealing Performance:** Once cured, the sealants demonstrate superior sealing performance even against high-pressure hydrogen gas. This provides an effective solution to the challenge posed by hydrogen molecules, which are extremely small and prone to leakage through tiny gaps.
- **Pressure, Temperature, and Vibration Resistance:** Hydrogen systems are typically exposed to high-pressure storage, high-temperature operation, and continuous vibrations in vehicles and industrial equipment. LOCTITE® anaerobic sealants exhibit excellent resistance to these harsh environmental factors, maintaining seal integrity over extended periods.
- **Durable Thermoset Polymer Seal:** The curing process forms a thermoset polymer with high mechanical strength and chemical stability. This contributes to the long-term reliability of systems by minimizing seal degradation under severe conditions.

Background & Industry Context

Towards achieving a carbon-neutral society, hydrogen energy is garnering attention across various sectors, including automotive, industrial, and power generation. However, ensuring safety in the storage, transport, and utilization of hydrogen gas remains one of the biggest challenges for its widespread adoption. Conventional sealing technologies are often insufficient for systems handling high-pressure and cryogenic hydrogen, creating a strong demand for higher-performance leak prevention technologies.

Strategic Significance & Outlook

LOCTITE®'s anaerobic sealants are expected to be adopted in a wide range of hydrogen infrastructure applications, including Fuel Cell Vehicles (FCVs), hydrogen storage tanks, hydrogen pipelines, and hydrogen fueling stations. This technology will be key to improving the safety and efficiency of the entire hydrogen supply chain, accelerating the commercialization and large-scale deployment of hydrogen energy. Henkel, through this innovative sealing solution, aims to contribute to building a sustainable future society.

Source: https://www.assembtek.com/blogs/knowledge-hub/sealing-hydrogen-systems-how-loctite%C2%AE-anaerobic-sealants-deliver-leak-free-performance-under-pressure