

TROY TECHNICAL

ADHESIVES & SEALANTS

WEEKLY REPORT

September 20 - September 26, 2026 | Issue 2026-W38

**Bond-line performance, cure process,
durability and cross-industry qualification**

12

ANALYZED ARTICLES

10

PRIORITY THEMES

Issued 2026-09-26 | English edition | fixed approved cover artwork



Adhesives & Sealants: the boundary moved from isolated claims to qualification evidence

12 English articles were reviewed independently from the Japanese edition. Ten themes are retained for management decisions.

SIGNAL 01 | CHEMISTRY

Teroson MS 940: Henkel's isocyanate-free adhesive specs

Henkel has launched Teroson MS 940, a high-performance isocyanate-free adhesive and sealant for rail and industrial applications.

SIGNAL 02 | FORMULATION

Henkel EV Adhesives: 2026 thermal gap filler specs explained

Henkel launched two high thermal conductivity materials for electric vehicles (EVs) in May 2026: Bergquist TGF 2030APS thermal gap filler (1.7 W/m · K) and Loctite TLB 9270APS thermal conductive adhesive (2 W/m · K).

SIGNAL 03 | APPLICATION & CURE

Toughened T-Link: L&L Products carbon fiber impact specs

L&L Products has introduced Toughened T-Link, an amorphous thermoplastic adhesive designed to enhance the performance of laminated epoxy carbon-fiber composites.

SIGNAL 04 | QUALIFIED PRODUCT

Virginia Tech: 4x stronger recyclable duct tape adhesives

Virginia Tech researchers have developed two innovative adhesives: one is four times stronger than commercial duct tape adhesive and degrades in minutes with weak alkaline water, while the other enables co-recycling of the adhesive and its plastic backing.

DECISION

Focus this week's management attention on bond-line performance, cure process, durability and cross-industry qualification. Move only when the linked evidence can be reproduced under your own operating conditions.

THREE MANAGEMENT MOVES

1. Buyers: evaluate the complete joint or sealed system under process and lifetime conditions.
2. Suppliers: provide substrate preparation, cure window, rework, aging and failure-analysis evidence.
3. Executives: track adhesion aging, cure variability, outgassing, regulation, repair and scale.

EVIDENCE DISCIPLINE

FACT states what the collected English source reports. BUSINESS READ and ACTION are editorial interpretations. UNKNOWN lists information that the source file does not establish. A linked article is not treated as independent confirmation of every claim.

Five numbers or evidence anchors that require conditions

1.7 W

A03

SOURCE-BOUND CONDITION

Henkel launched two high thermal conductivity materials for electric vehicles (EVs) in May 2026: Bergquist TGF 2030APS thermal gap filler (1.7 W/m · K) and Loctite TLB 9270APS thermal conductive adhesive (2 W/m · K).

66%

A07

SOURCE-BOUND CONDITION

Internal testing showed that composite panels incorporating Toughened T-Link film demonstrated a significant improvement in short beam shear performance and a 66% increase in compression strength after impact.

10x

A11

SOURCE-BOUND CONDITION

achieved a 10x improvement in thermal conductivity with hBN nanosheet-polymer encapsulation.

100%

A09

SOURCE-BOUND CONDITION

Notably, UF 88UV provides nearly 100% visible light transparency, room-temperature flowability, and exceptional reliability, with no delamination observed after five 260°C reflow cycles post-PCT.

3.0 W

A04

SOURCE-BOUND CONDITION

Dow offers DOWSIL TC-5533 as a 3.0 W/mK gap filler, while Henkel provides a 1.7 W/mK silicone-free, battery-grade compound.

HOW TO USE THESE NUMBERS

Each value is shown with the condition stated in the collected English article. Do not compare values across different test methods, device sizes, operating temperatures or commercial stages without normalizing those conditions.

Where the value chain moved

Each stage combines one leading theme and one supporting theme. The report treats handoffs as evidence transfers, not decorative arrows.



EVIDENCE REQUIRED AT EACH HANDOFF

Chemistry to Formulation	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck adhesion aging, cure variability, outgassing, regulation, repair and scale.
Formulation to Application & cure	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck adhesion aging, cure variability, outgassing, regulation, repair and scale.
Application & cure to Qualified product	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck adhesion aging, cure variability, outgassing, regulation, repair and scale.
Qualified product to Repair & circularity	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck adhesion aging, cure variability, outgassing, regulation, repair and scale.

COMMON CONTROL POINT

No theme moves to a commercial commitment until a named owner has reproduced the relevant evidence and documented adhesion aging, cure variability, outgassing, regulation, repair and scale.

Priority map: maturity and next decision locus



REPRODUCIBLE POSITIONING RULE
Horizontal position uses five discrete stages: Research, Prototype, Joint evaluation, Product adoption and Scale. The vertical bands classify the next decision locus: Tech / process, System / adoption, or Business / rules (including supply systems). Article-title cues take precedence; the overview is used only when the title is silent. These are categories, not impact ranks. Bubble diameter reflects the editorial score.

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P01

Teroson MS 940: Henkel's isocyanate-free adhesive specs

A06 | Chemistry | Product adoption

Date not stated

FACT

Henkel has launched Teroson MS 940, a high-performance isocyanate-free adhesive and sealant for rail and industrial applications. This new product surpasses the mechanical performance of standard silane-modified polymer (SMP) solutions in elongation and tensile strength, making it a viable replacement for polyurethane systems. Teroson MS 940 is specifically designed for bonding and sealing structural components in railway vehicles, offering resistance to UV radiation, weathering, and harsh railway cleaning agents.

WHY IT MATTERS

The decision relevance is bond-line performance, cure process, durability and cross-industry qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide substrate preparation, cure window, rework, aging and failure-analysis evidence.

ACTION

Within 30 days, evaluate the complete joint or sealed system under process and lifetime conditions; record the evidence and owner against P01.

UNKNOWN

Still unproven or incompletely stated: adhesion aging, cure variability, outgassing, regulation, repair and scale.

EDITORIAL SCORE 21/25 | MATURITY 4/5 | DECISION LOCUS: BUSINESS / RULES

P02

Henkel EV Adhesives: 2026 thermal gap filler specs explained

A03 | Formulation | Product adoption

Date not stated

FACT

Henkel launched two high thermal conductivity materials for electric vehicles (EVs) in May 2026: Bergquist TGF 2030APS thermal gap filler (1.7 W/m·K) and Loctite TLB 9270APS thermal conductive adhesive (2 W/m·K). These products aim to significantly improve thermal management in EV battery packs, critical for performance and longevity. Hoenle Adhesives also introduced a new UV-curable formed-in-place gasket material in March 2026, marking an acceleration in advanced bonding and sealing solutions.

WHY IT MATTERS

The decision relevance is bond-line performance, cure process, durability and cross-industry qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide substrate preparation, cure window, rework, aging and failure-analysis evidence.

ACTION

Within 30 days, evaluate the complete joint or sealed system under process and lifetime conditions; record the evidence and owner against P02.

UNKNOWN

Still unproven or incompletely stated: adhesion aging, cure variability, outgassing, regulation, repair and scale.

EDITORIAL SCORE 20/25 | MATURITY 4/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P03

Toughened T-Link: L&L Products carbon fiber impact specs

A07 | Application & cure | Product adoption

Date not stated

FACT

L&L Products has introduced Toughened T-Link, an amorphous thermoplastic adhesive designed to enhance the performance of laminated epoxy carbon-fiber composites. Internal testing showed that composite panels incorporating Toughened T-Link film demonstrated a significant improvement in short beam shear performance and a 66% increase in compression strength after impact.

WHY IT MATTERS

The decision relevance is bond-line performance, cure process, durability and cross-industry qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide substrate preparation, cure window, rework, aging and failure-analysis evidence.

ACTION

Within 30 days, evaluate the complete joint or sealed system under process and lifetime conditions; record the evidence and owner against P03.

UNKNOWN

Still unproven or incompletely stated: adhesion aging, cure variability, outgassing, regulation, repair and scale.

EDITORIAL SCORE 19/25 | MATURITY 4/5 | DECISION LOCUS: TECH / PROCESS

P04

Virginia Tech: 4x stronger recyclable duct tape adhesives

A01 | Qualified product | Product adoption

Date not stated

FACT

Virginia Tech researchers have developed two innovative adhesives: one is four times stronger than commercial duct tape adhesive and degrades in minutes with weak alkaline water, while the other enables co-recycling of the adhesive and its plastic backing. This breakthrough integrates degradability and recyclability directly into the adhesive's molecular structure. This advancement significantly reduces the environmental impact of disposable adhesive products and enhances sustainability throughout their lifecycle.

WHY IT MATTERS

The decision relevance is bond-line performance, cure process, durability and cross-industry qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide substrate preparation, cure window, rework, aging and failure-analysis evidence.

ACTION

Within 30 days, evaluate the complete joint or sealed system under process and lifetime conditions; record the evidence and owner against P04.

UNKNOWN

Still unproven or incompletely stated: adhesion aging, cure variability, outgassing, regulation, repair and scale.

EDITORIAL SCORE 19/25 | MATURITY 4/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P05

SEMICON West 2026: 4 startup specs for hBN and 3D SRAM

A11 | Repair & circularity | Pilot

Date not stated

FACT

Four finalists from SEMI Startups for Sustainable Semiconductors presented groundbreaking innovations at SEMICON West 2026. HEXAspec Inc. achieved a 10x improvement in thermal conductivity with hBN nanosheet-polymer encapsulation. CHIPADD, Corp. introduced ultra-efficient, directly manufactured copper cooling for GPUs/CPU's, including robust bonding materials.

WHY IT MATTERS

The decision relevance is bond-line performance, cure process, durability and cross-industry qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide substrate preparation, cure window, rework, aging and failure-analysis evidence.

ACTION

Within 30 days, evaluate the complete joint or sealed system under process and lifetime conditions; record the evidence and owner against P05.

UNKNOWN

Still unproven or incompletely stated: adhesion aging, cure variability, outgassing, regulation, repair and scale.

EDITORIAL SCORE 19/25 | MATURITY 2/5 | DECISION LOCUS: SYSTEM / ADOPTION

P06

YINCAE UF 66UV/88UV: UV-curable underfill specs for 2026

A09 | Chemistry | Research

Date not stated

FACT

YINCAE unveiled its UV-curable underfill technologies, UF 66UV and UF 88UV, at IMAPS 2026. UF 66UV offers high-speed processing and robust reliability for advanced electronic packaging. Notably, UF 88UV provides nearly 100% visible light transparency, room-temperature flowability, and exceptional reliability, with no delamination observed after five 260°C reflow cycles post-PCT.

WHY IT MATTERS

The decision relevance is bond-line performance, cure process, durability and cross-industry qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide substrate preparation, cure window, rework, aging and failure-analysis evidence.

ACTION

Within 30 days, evaluate the complete joint or sealed system under process and lifetime conditions; record the evidence and owner against P06.

UNKNOWN

Still unproven or incompletely stated: adhesion aging, cure variability, outgassing, regulation, repair and scale.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: TECH / PROCESS

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P07

Brewer Science: Laser release material for 350°C processes

A10 | Formulation | Research

Date not stated

FACT

Brewer Science will present new data at IMAPS 2026 on a high-temperature-stable laser release material, designed for advanced packaging processes from 250°C to 350°C. This material supports demanding processes like PECVD, hybrid bonding, and silver sintering. The TBDB system, combined with BrewerBOND® C1301 series adhesives, maintains structural integrity up to 350°C and enables efficient UV laser debonding with easy solvent cleanup, critical for next-generation semiconductor manufacturing.

WHY IT MATTERS

The decision relevance is bond-line performance, cure process, durability and cross-industry qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide substrate preparation, cure window, rework, aging and failure-analysis evidence.

ACTION

Within 30 days, evaluate the complete joint or sealed system under process and lifetime conditions; record the evidence and owner against P07.

UNKNOWN

Still unproven or incompletely stated: adhesion aging, cure variability, outgassing, regulation, repair and scale.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

P08

DOWSIL TC-5533: Dow thermal gap compound vs Henkel offerings

A04 | Application & cure | Product adoption

Date not stated

FACT

Material innovation in the thermal gap compound market focuses on developing high thermal conductivity and eco-friendly products, especially for battery pack assemblies. Dow offers DOWSIL TC-5533 as a 3.0 W/mK gap filler, while Henkel provides a 1.7 W/mK silicone-free, battery-grade compound. These products enable efficient thermal management of heat-generating components like EV batteries, contributing to enhanced system reliability and lifespan.

WHY IT MATTERS

The decision relevance is bond-line performance, cure process, durability and cross-industry qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide substrate preparation, cure window, rework, aging and failure-analysis evidence.

ACTION

Within 30 days, evaluate the complete joint or sealed system under process and lifetime conditions; record the evidence and owner against P08.

UNKNOWN

Still unproven or incompletely stated: adhesion aging, cure variability, outgassing, regulation, repair and scale.

EDITORIAL SCORE 19/25 | MATURITY 4/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P09

Birjand University: Plant nanocatalyst for water antibiotics

A02 | Qualified product | Pilot

Date not stated

FACT

Researchers at Birjand University of Medical Sciences have developed a plant-based magnetic photocatalyst capable of completely removing ciprofloxacin antibiotics from water under simulated sunlight. This nanocomposite combines magnesium iron sulfide (MgFe2S4) and cobalt bismuth oxydioxide (CoBiO2I), two semiconductors. The technology shows promise for treating pharmaceutical-contaminated water as an eco-friendly and efficient solution.

WHY IT MATTERS

The decision relevance is bond-line performance, cure process, durability and cross-industry qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide substrate preparation, cure window, rework, aging and failure-analysis evidence.

ACTION

Within 30 days, evaluate the complete joint or sealed system under process and lifetime conditions; record the evidence and owner against P09.

UNKNOWN

Still unproven or incompletely stated: adhesion aging, cure variability, outgassing, regulation, repair and scale.

EDITORIAL SCORE 19/25 | MATURITY 2/5 | DECISION LOCUS: BUSINESS / RULES

P10

Heraeus silver sintering: Scalable power module roadmap

A08 | Repair & circularity | Product adoption

Date not stated

FACT

Heraeus has unveiled a new approach to scalable silver sintering for next-generation power modules, addressing the critical challenge of balancing throughput with precision. By optimizing precise paste deposition, ensuring compatibility with bare copper, and offering flexible processing options, the company aims to enhance throughput without compromising accuracy or reliability.

WHY IT MATTERS

The decision relevance is bond-line performance, cure process, durability and cross-industry qualification. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, provide substrate preparation, cure window, rework, aging and failure-analysis evidence.

ACTION

Within 30 days, evaluate the complete joint or sealed system under process and lifetime conditions; record the evidence and owner against P10.

UNKNOWN

Still unproven or incompletely stated: adhesion aging, cure variability, outgassing, regulation, repair and scale.

EDITORIAL SCORE 18/25 | MATURITY 4/5 | DECISION LOCUS: TECH / PROCESS

Playbook and 0-5 year roadmap

STAKEHOLDER	NOW 0-30 DAYS	NEXT 1-12 MONTHS	LATER 1-5 YEARS
Operating companies	evaluate the complete joint or sealed system under process and lifetime conditions	Run production-like qualification with explicit acceptance and stop criteria.	Build a portfolio and architecture that can absorb technology and supplier changes.
Materials, equipment and technology suppliers	provide substrate preparation, cure window, rework, aging and failure-analysis evidence	Create shared reliability, process-window and failure-analysis data with customers.	Standardize interfaces, traceability, lifecycle support and recovery services.
Trading, investment and legal teams	Map adhesion aging, cure variability, outgassing, regulation, repair and scale.	Contract for capacity, quality, change notice, liability, alternatives and exit.	Diversify regional, technical and customer concentration risk.

ROADMAP

NOW 0-30 DAYS Evidence ledger Owner: Strategy + quality Deliverable: claim, source, condition, owner	NOW 0-30 DAYS Risk screen Owner: Procurement + legal Deliverable: unknowns, alternatives, stop	NEXT 1-12 MONTHS Joint qualification Owner: R&D + supplier Deliverable: process window and failure data
NEXT 1-12 MONTHS Commercial gate Owner: Business + finance Deliverable: unit economics and capacity	LATER 1-5 YEARS Platform strategy Owner: Executive team Deliverable: portfolio and interface roadmap	LATER 1-5 YEARS Service layer Owner: Operations + channel Deliverable: monitoring, maintenance and recovery

GO / NO-GO GATES

GATE	OWNER	REQUIRED EVIDENCE	NO-GO CONDITION
G1 Evidence	Quality	Source, test conditions and reproducibility	No traceable evidence
G2 Integration	R&D	Interface, process window and failure analysis	Cannot meet system conditions
G3 Commercial	Business	Capacity, total cost, contract and alternatives	Economics or supply cannot be supported
G4 Lifecycle	Operations	Monitoring, maintenance, change notice and exit	No accountable operating plan

ANALYZED ARTICLES | ITEMS 01-12

Every title and URL is displayed in full. URLs wrap without shortening and remain clickable. A verified-reference label means the translated HTML did not retain its original source URL.

ID	FULL ARTICLE TITLE	FULL SOURCE / VERIFIED REFERENCE URL - CLICKABLE
A01	Virginia Tech: 4x stronger recyclable duct tape adhesives	https://newatlas.com/materials/recyclable-reversible-adhesives-tape/
A02	Birjand University: Plant nanocatalyst for water antibiotics	https://bioengineer.org/plant-powered-nanocatalyst-destroys-ciprofloxacin-antibiotic-in-water-with-sunlight/
A03	Henkel EV Adhesives: 2026 thermal gap filler specs explained	https://www.kingsresearch.com/blog/adhesives-sealants-market-trends
A04	DOWSIL TC-5533: Dow thermal gap compound vs Henkel offerings	https://www.futuremarketinsights.com/reports/thermal-gap-compound-s-market
A05	Materials AI: Foundation models for clean energy challenges	https://www.azom.com/news.aspx?newsID=65822
A06	Teroson MS 940: Henkel's isocyanate-free adhesive specs	https://www.henkel.com/press-and-media/press-releases-and-kits/2026-09-21-henkel-launches-new-adhesive-and-sealant-for-high-performance-bonding-in-rail-and-industrial-applications-2242040
A07	Toughened T-Link: L&L Products carbon fiber impact specs	https://pulse2.com/ll-products-launches-toughened-t-link-thermoplastic-adhesive-for-carbon-fiber-composites/
A08	Heraeus silver sintering: Scalable power module roadmap	https://www.3dincites.com/2026/09/precision-at-speed-silver-sintering-for-next-gen-power-module/
A09	YINCAE UF 66UV/88UV: UV-curable underfill specs for 2026	https://www.electronicmedia.info/2026/09/22/yincae-uf-66uv-uv-curable-underfill/
A10	Brewer Science: Laser release material for 350°C processes	https://www.brewerscience.com/news-imaps-2026/
A11	SEMICON West 2026: 4 startup specs for hBN and 3D SRAM	https://www.semi.org/en/blogs/finalists-for-semi-startups-for-sustainable-semiconductors-to-present-live-pitches-at-semicon-west-2026
A12	Indium Corporation: AI/HPC TIM materials explained for IMAPS	https://www.3dincites.com/2026/09/indium-corporation-experts-to-present-advanced-packaging-ai-and-high-performance-computing-materials-solutions-at-imaps-symposium/

Adhesives_Sealants — Selected Articles

Date: 2026-09-27

Articles: 12

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#01 Virginia Tech: 4x stronger recyclable duct tape adhesives

Published September 21, 2026 Phys.org USA



OVERVIEW

Virginia Tech researchers have developed two innovative adhesives: one is four times stronger than commercial duct tape adhesive and degrades in minutes with weak alkaline water, while the other enables co-recycling of the adhesive and its plastic backing. This breakthrough integrates degradability and recyclability directly into the adhesive's molecular structure. This advancement significantly reduces the environmental impact of disposable adhesive products and enhances sustainability throughout their lifecycle.

Key Findings

A research team at Virginia Tech has developed two innovative adhesives that combine high performance with enhanced sustainability. One adhesive is four times stronger than commercially available duct tape adhesives yet can be degraded in minutes using weak alkaline water. The second innovation involves a tape adhesive designed to allow for the co-recycling of both the adhesive and its plastic backing.

Technical Details

- **High-Strength, Debondable Adhesive:** This adhesive significantly boosts bonding strength, achieving approximately four times the adhesion of conventional duct tape adhesives. Simultaneously, it is engineered to effectively degrade at a molecular level when exposed to specific environmental conditions, specifically by immersion in weak alkaline water for several minutes. This capability dramatically simplifies the separation and recovery of bonded products post-use, thereby streamlining recycling processes.
- **Co-Recyclable Tape Adhesive:** The second innovation focuses on a tape adhesive and its plastic backing, which are designed to be processed together through standard recycling streams. This allows the entire tape product to be reused as a resource rather than discarded as waste. The research team successfully integrated degradability and recyclability directly into the adhesive's molecular structure.
- Both adhesives incorporate specific chemical bonds within their molecular architecture, enabling them to maintain high bonding strength during use while allowing for easy degradation or recycling at the desired time.

Background & Context

Adhesives are indispensable materials in modern society, but their high durability often hinders product recycling, contributing to waste management challenges. Widely used products like duct tape, due to their mass consumption, have a substantial environmental impact.

This research aims to transform the concept of 'disposable' adhesives, promoting a shift towards sustainable bonding solutions that reduce environmental impact across the entire product lifecycle.

Strategic Significance & Outlook

Virginia Tech's achievement holds the potential to revolutionize adhesive technologies across a wide array of sectors, including packaging, construction, and consumer products. High-strength yet recyclable adhesives represent a critical step towards improving resource efficiency, reducing waste, and realizing a circular economy. Future work will likely focus on exploring broader material applicability, as well as optimizing scale-up and cost-effectiveness for commercialization.

Source: <https://newatlas.com/materials/recyclable-reversible-adhesives-tape/>

Collected: September 26, 2026 | Automated Research System (Gemini API)

#02 Birjand University: Plant nanocatalyst for water antibiotics

Published September 20, 2026 Tech Xplore (Birjand University of Medical Sciences) イラン



OVERVIEW

Researchers at Birjand University of Medical Sciences have developed a plant-based magnetic photocatalyst capable of completely removing ciprofloxacin antibiotics from water under simulated sunlight. This nanocomposite combines magnesium iron sulfide (MgFe_2S_4) and cobalt bismuth oxyiodide (CoBiO_2I), two semiconductors. The technology shows promise for treating pharmaceutical-contaminated water as an eco-friendly and efficient solution.

IN DEPTH

A research team at Birjand University of Medical Sciences has developed a plant-derived magnetic photocatalyst that successfully and completely decomposes the antibiotic ciprofloxacin in water under simulated sunlight. This innovative nanocomposite material holds the potential to offer a sustainable and efficient solution for treating pharmaceutical-contaminated water.

Technical Details

The developed nanocatalyst is a composite material combining two types of semiconductors: magnesium iron sulfide (MgFe_2S_4) and cobalt bismuth oxyiodide (CoBiO_2I). Each of these semiconductors possesses distinct light absorption and charge separation characteristics, and their combination allows for more efficient utilization of a broader solar spectrum, leading to higher catalytic activity.

- **Component Materials:** Magnetic magnesium iron sulfide (MgFe_2S_4) provides magnetic properties, facilitating easy separation and recovery of the catalyst. Cobalt bismuth oxyiodide (CoBiO_2I) enhances visible light responsiveness and promotes photocatalytic reactions.
- **Photocatalytic Mechanism:** When simulated sunlight irradiates the nanocomposite, the semiconductors absorb light energy to generate electrons and holes. These electron-hole pairs react with oxygen and water molecules in the water, producing highly oxidative reactive oxygen species (e.g., hydroxyl radicals). These reactive oxygen species then decompose ciprofloxacin molecules into harmless substances.
- **High Removal Efficiency:** Experiments confirmed the complete removal of ciprofloxacin antibiotics from water under simulated sunlight, demonstrating the high efficiency of this method.

Background & Context

Pharmaceuticals like antibiotics are often not fully removed by conventional wastewater treatment plants, leading to their discharge into rivers and groundwater, which is a global problem contributing to environmental pollution and the emergence of antibiotic-resistant bacteria. Traditional physical and chemical treatment methods face challenges such as high costs, secondary pollution, and incomplete degradation. Photocatalytic technology, which utilizes solar energy to decompose pollutants, is anticipated as a low-environmental-impact and sustainable water treatment solution.

Strategic Significance & Outlook

This plant-based magnetic photocatalyst holds significant potential for application in purifying water bodies contaminated with antibiotics, such as hospital wastewater, pharmaceutical factory effluent, and domestic wastewater. Its magnetic properties facilitate easy recovery and reuse of the catalyst after use, also contributing to reduced operational costs. In the future, this technology is expected to help solve the problem of pharmaceutical contamination and contribute to securing safe water resources.

Source: <https://bioengineer.org/plant-powered-nanocatalyst-destroys-ciprofloxacin-antibiotic-in-water-with-sunlight/>

#03 Henkel EV Adhesives: 2026 thermal gap filler specs explained

Published September 21, 2026 Kings Research USA



OVERVIEW

Henkel launched two high thermal conductivity materials for electric vehicles (EVs) in May 2026: Bergquist TGF 2030APS thermal gap filler (1.7 W/m·K) and Loctite TLB 9270APS thermal conductive adhesive (2 W/m·K). These products aim to significantly improve thermal management in EV battery packs, critical for performance and longevity. Hoenle Adhesives also introduced a new UV-curable formed-in-place gasket material in March 2026, marking an acceleration in advanced bonding and sealing solutions.

Key Findings

Henkel announced two innovative thermal management materials for the electric vehicle (EV) market in May 2026. These materials play a crucial role in enhancing the efficiency and lifespan of EV batteries. Specifically, the Bergquist TGF 2030APS thermal gap filler achieves a high thermal conductivity of $1.7 \text{ W/m}\cdot\text{K}$, while the Loctite TLB 9270APS thermal conductive adhesive reaches $2 \text{ W/m}\cdot\text{K}$. These advancements are critical for the reliability and performance improvement of EVs.

Technical Details

The Bergquist TGF 2030APS is designed to effectively fill gaps between battery cells and cooling systems, facilitating efficient heat transfer to maintain a uniform temperature across the battery pack. This mitigates the risk of performance degradation and premature aging due to overheating. The Loctite TLB 9270APS combines strong adhesion with high thermal conductivity, making it ideal for applications requiring both structural integrity and heat dissipation.

Concurrently, Hoenle Adhesives introduced a new UV-curable formed-in-place gasket material in March 2026. This technology allows for rapid curing during the manufacturing process, contributing to improved production efficiency and cost reduction in electronic and automotive components that demand precise sealing.

Background and Context

With the rapid expansion of the EV market, battery safety and performance, particularly thermal management, have become paramount challenges. High temperatures accelerate battery degradation and can, in severe cases, lead to thermal runaway. Therefore, highly efficient thermal interface materials and reliable sealing technologies are indispensable for the widespread adoption and performance enhancement of EVs.

Strategic Significance and Outlook

These new products provide EV manufacturers with advanced options for designing high-performance and safe battery packs. The importance of thermal management materials will continue to grow, especially as batteries with higher energy densities are developed. Ongoing innovation in adhesives and sealants will serve as a foundational pillar supporting the sustainable growth of the entire EV industry.

Source: <https://www.kingsresearch.com/blog/adhesives-sealants-market-trends>

Collected: September 26, 2026 | Automated Research System (Gemini API)

#04 DOWSIL TC-5533: Dow thermal gap compound vs Henkel offerings

Published September 24, 2026 openPR.com (Future Market Insights) USA



OVERVIEW

Material innovation in the thermal gap compound market focuses on developing high thermal conductivity and eco-friendly products, especially for battery pack assemblies. Dow offers DOWSIL TC-5533 as a 3.0 W/mK gap filler, while Henkel provides a 1.7 W/mK silicone-free, battery-grade compound. These products enable efficient thermal management of heat-generating components like EV batteries, contributing to enhanced system reliability and lifespan.

Key Findings

In the thermal gap compound market, material innovation is intensely focused on developing high thermal conductivity and environmentally friendly products. Specifically for electric vehicle (EV) battery pack assemblies, Dow offers 'DOWSIL TC-5533,' a gap filler with a thermal conductivity of 3.0 W/mK, while Henkel provides a silicone-free, battery-grade material with 1.7 W/mK. These products facilitate efficient thermal management of heat-generating components, significantly improving system performance and lifespan.

Technical Details

Dow's DOWSIL TC-5533, with its superior thermal conductivity of 3.0 W/mK, minimizes thermal resistance between battery cells and cooling fins, efficiently dissipating heat. This prevents the formation of hot spots within the battery pack and equalizes temperature distribution, thereby preventing battery overheating. Conversely, Henkel's silicone-free battery-grade gap compound offers 1.7 W/mK thermal conductivity while avoiding potential issues associated with silicones, such as the release of volatile organic compounds in sealed environments. This characteristic is particularly advantageous in cleanroom environments and for precision electronic devices.

Background and Context

With the widespread adoption and performance enhancement of EVs, the amount of heat generated by battery packs is increasing, making efficient and reliable thermal management indispensable. Proper thermal management directly impacts battery safety, range, charging speed, and overall lifespan. Stricter environmental regulations are also driving a shift towards sustainable materials, increasing demand for eco-friendly, high thermal conductivity compounds.

Strategic Significance and Outlook

These advanced thermal gap compounds are crucial for improving the performance and safety of EV batteries. In the future, as higher energy density and higher power battery systems are introduced, materials with even greater thermal conductivity and reliability will be required. Material manufacturers are expected to continue driving innovation in material science to meet these demands, providing sustainable and high-performance solutions.

Source: <https://www.futuremarketinsights.com/reports/thermal-gap-compounds-market>

Collected: September 26, 2026 | Automated Research System (Gemini API)

#05 Materials AI: Foundation models for clean energy challenges

Published September 21, 2026 AZoM (ChemRxiv preprint server) USA



OVERVIEW

A recent ChemRxiv preprint explores the evolution of AI in materials science, discussing the transition from narrow, task-specific machine learning models to broader foundation models applicable across diverse materials problems. The research suggests that AI advancements are accelerating research methodologies to meet increasing material demands in clean energy, sustainable construction, and advanced electronics, emphasizing AI's role in materials discovery and optimization.

Key Findings

A recent preprint published on the ChemRxiv preprint server focuses on the evolution of Artificial Intelligence (AI) in materials science, examining the transition from narrow, task-specific Machine Learning (ML) models to broader, reusable foundation models for a wide range of materials problems. This research clearly suggests that advancements in AI within materials science are accelerating research methodologies to address the growing demand for materials in sectors such as clean energy, sustainable construction, and advanced electronics.

Technical Details

The paper points out the challenge that existing ML models, while optimized for specific datasets and tasks, often lack generality and require retraining for new materials problems. In contrast, by applying the "foundation model" approach—similar to large language models (LLMs) in natural language processing—to materials science, the aim is to build more versatile AI models. Such foundation models are expected to learn general patterns and relationships from vast materials data, contributing to the efficient prediction of unknown material properties and the design of new materials. This approach has the potential to significantly accelerate the materials discovery process by complementing traditional, time-consuming, and costly experimental methods.

Background and Context

Modern society is increasingly reliant on new materials in key areas such as energy, environment, and information technology. For example, the development of batteries, solar cells, high-performance semiconductors, and lightweight composite materials directly impacts the overall progress of society. However, the process of discovering and optimizing these new materials is highly complex and time-consuming. The evolution of AI technology, especially machine learning, is anticipated as a powerful tool to address this challenge, aiming to transform the research paradigm in materials science through data-driven approaches.

Strategic Significance and Outlook

The establishment of foundation models in materials science holds the potential to enable the utilization of cross-cutting insights across multiple materials problems, dramatically improving the speed and efficiency of new material development. This is expected to accelerate innovation in fields such as clean energy technologies (e.g., high-efficiency solar cells, next-generation batteries), sustainable construction materials, and advanced electronics (e.g., high-performance semiconductor materials, flexible devices). This transition will be a critical step for materials scientists and engineers to overcome current challenges and build a more sustainable and technologically advanced future.

Source: <https://www.azom.com/news.aspx?newsID=65822>

Collected: September 26, 2026 | Automated Research System (Gemini API)

#06 Teroson MS 940: Henkel's isocyanate-free adhesive specs

Published September 21, 2026 Henkel Adhesive Technologies Germany



OVERVIEW

Henkel has launched Teroson MS 940, a high-performance isocyanate-free adhesive and sealant for rail and industrial applications. This new product surpasses the mechanical performance of standard silane-modified polymer (SMP) solutions in elongation and tensile strength, making it a viable replacement for polyurethane systems. Teroson MS 940 is specifically designed for bonding and sealing structural components in railway vehicles, offering resistance to UV radiation, weathering, and harsh railway cleaning agents.

Key Findings

Henkel has launched Teroson MS 940, a new high-performance, isocyanate-free adhesive and sealant for rail and industrial applications, demonstrating superior mechanical properties compared to conventional silane-modified polymer (SMP) solutions. This product offers a sustainable alternative to polyurethane systems, addressing evolving environmental and safety regulations.

Technical Details

Teroson MS 940 is formulated as an advanced silane-modified polymer, eliminating isocyanates to improve worker safety and reduce environmental impact. It exhibits significantly enhanced elongation and tensile strength, outperforming standard SMP products. The adhesive is particularly suited for structural and semi-structural bonding and sealing of components such as windows, doors, and panels in railway vehicles. It offers robust resistance to UV radiation, weathering, and aggressive railway cleaning agents, ensuring long-term durability and reduced maintenance requirements in demanding environments.

Background & Context

The adhesives and sealants industry is experiencing a strong drive towards isocyanate-free formulations due to stricter environmental regulations and increased focus on occupational health. Industries like rail and automotive, which demand high safety and durability, are actively seeking sustainable yet high-performance bonding solutions. Traditional polyurethane-based adhesives often contain isocyanates, thus creating a significant market need for effective alternatives that do not compromise on performance.

Strategic Significance & Outlook

The introduction of Teroson MS 940 is poised to significantly impact bonding and sealing processes in railway vehicle manufacturing. Its combination of high performance and an isocyanate-free composition offers manufacturers a solution that enhances both production safety and regulatory compliance. Henkel aims to solidify its position as a leader in adhesive technology by providing more environmentally friendly and high-performance material solutions to industrial sectors. This technology may also find applications in other industries requiring durable, high-performance adhesion.

Source: <https://www.henkel.com/press-and-media/press-releases-and-kits/2026-09-21-henkel-launches-new-adhesive-and-sealant-for-high-performance-bonding-in-rail-and-industrial-applications-2242040>

Collected: September 26, 2026 | Automated Research System (Gemini API)

#07 Toughened T-Link: L&L Products carbon fiber impact specs

Published September 21, 2026 Pulse 2.0 USA



OVERVIEW

L&L Products has introduced Toughened T-Link, an amorphous thermoplastic adhesive designed to enhance the performance of laminated epoxy carbon-fiber composites. Internal testing showed that composite panels incorporating Toughened T-Link film demonstrated a significant improvement in short beam shear performance and a 66% increase in compression strength after impact. This adhesive specifically targets improvements in ductility, flexural performance, energy absorption, and impact resistance of carbon fiber composites.

Key Findings

L&L Products has launched Toughened T-Link, a novel, fully amorphous thermoplastic adhesive engineered to dramatically improve the ductility, flexural performance, energy absorption, and impact resistance of laminated epoxy carbon-fiber composites. This innovative material achieved a remarkable 66% increase in post-impact compression strength in composite panels during internal testing.

Technical Details

Toughened T-Link is an adhesive film based on a unique amorphous thermoplastic polymer. According to internal test data, composite panels manufactured by combining Toughened T-Link film with epoxy prepreg layers showed a significant improvement in short beam shear performance, as measured by ASTM D2344, compared to panels made solely from epoxy prepreg layers. Furthermore, ASTM D7137 testing revealed an excellent 66% increase in compression strength after impact, indicating superior impact resistance. This material is designed to impart flexibility and strength between composite plies, effectively dissipating and absorbing impact energy, thereby suppressing delamination and crack propagation.

Background & Context

Carbon fiber composites are widely utilized in aerospace, automotive, and wind energy sectors due to their exceptional strength-to-weight ratio. However, these materials often suffer from vulnerability to delamination and impact damage, a critical concern for safety in applications like aircraft bird strikes or automotive collisions. Traditional composites tend to exhibit brittle fracture under impact, making improvements in toughness a long-standing challenge. Interlaminar toughening agents like Toughened T-Link are crucial for expanding the practical application range of composites to more demanding environments.

Strategic Significance & Outlook

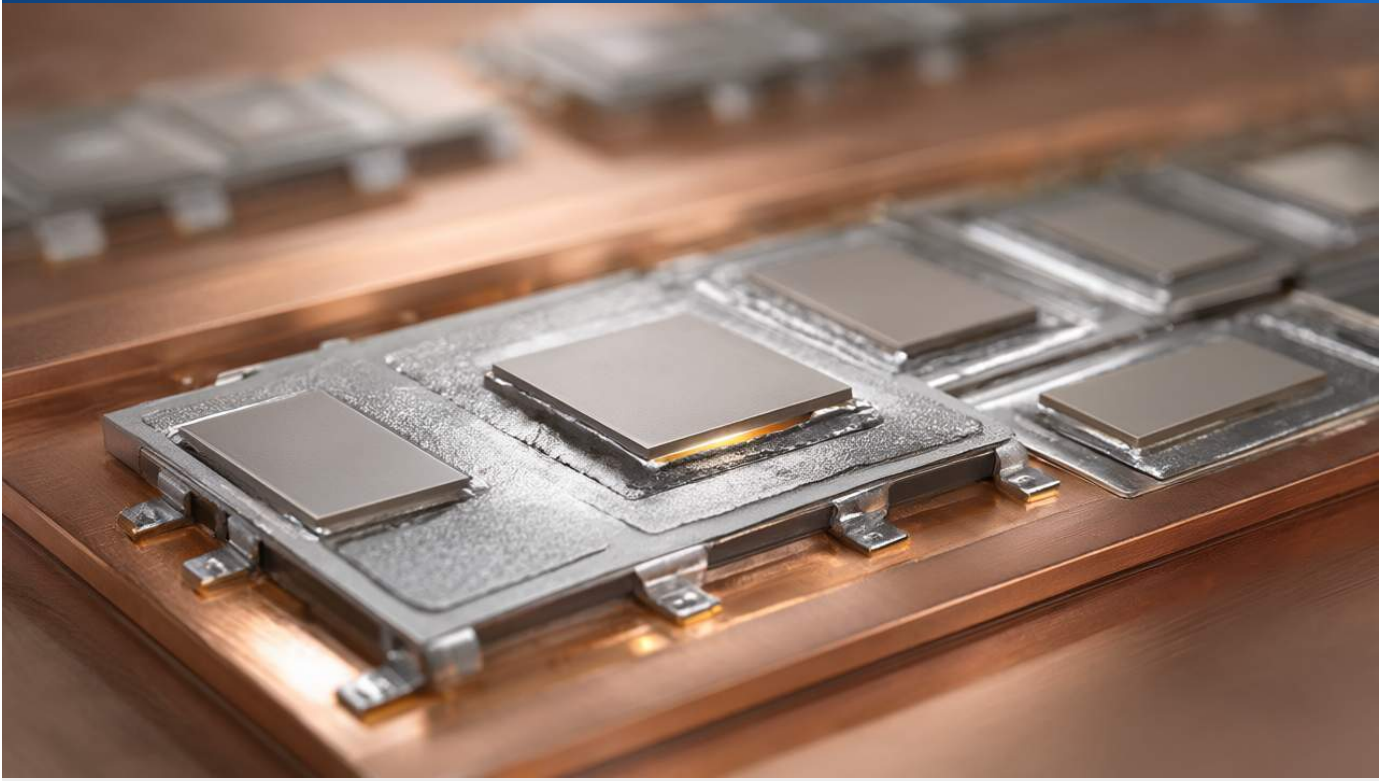
The introduction of Toughened T-Link opens new possibilities in the design and application of carbon fiber composites. The enhanced energy absorption and impact resistance will accelerate its adoption in high-reliability applications such as aircraft wings and fuselages, automotive safety structures, and high-performance sports equipment. This will lead to improved product safety and durability, driving growth across the composite materials market. L&L Products is expected to further strengthen its offerings of high-performance composite material solutions through this technology.

Source: <https://pulse2.com/ll-products-launches-toughened-t-link-thermoplastic-adhesive-for-carbon-fiber-composites/>

Collected: September 26, 2026 | Automated Research System (Gemini API)

#08 Heraeus silver sintering: Scalable power module roadmap

Published September 22, 2026 3D InCites Germany



OVERVIEW

Heraeus has unveiled a new approach to scalable silver sintering for next-generation power modules, addressing the critical challenge of balancing throughput with precision. By optimizing precise paste deposition, ensuring compatibility with bare copper, and offering flexible processing options, the company aims to enhance throughput without compromising accuracy or reliability. This technology promises to resolve high-precision die-attach issues in power module manufacturing and significantly boost production efficiency.

Key Findings

Heraeus has introduced a new approach to silver sintering that addresses the critical challenges of scalability and precision in die-attach processes for next-generation power modules. By optimizing precise paste deposition, ensuring compatibility with bare copper, and providing flexible processing options, this method enables high-throughput manufacturing without compromising the reliability of power modules.

Technical Details

The new silver sintering process proposed by Heraeus focuses on three key elements. First, precise paste deposition technology ensures that the optimal amount of silver paste is accurately placed within the restricted die-attach area, minimizing material waste and forming a uniform sintered layer. Second, establishing direct sintering compatibility with bare copper (unoxidized copper) eliminates the need for expensive surface treatment processes, significantly contributing to manufacturing cost reduction and process simplification. Third, flexible processing options, including variations in furnace types and sintering times, allow for optimization tailored to specific production lines and volumes. These combined elements enable a substantial increase in production throughput while maintaining the performance and lifetime of power modules.

Background & Context

Modern power modules are utilized in a wide range of high-performance and high-reliability applications, such as electric vehicles, renewable energy systems, and industrial motor drives. The die attachment, which connects semiconductor chips (dies) to the substrate within these modules, is paramount for thermal management and electrical performance. Silver sintering, known for its superior thermal and electrical conductivity and lead-free composition, has become the dominant die-attach technology for next-generation power modules. However, conventional silver sintering processes have faced challenges related to complex pre-treatment, high costs, and throughput limitations. Heraeus's approach offers a direct solution to these industry-wide issues.

Strategic Significance & Outlook

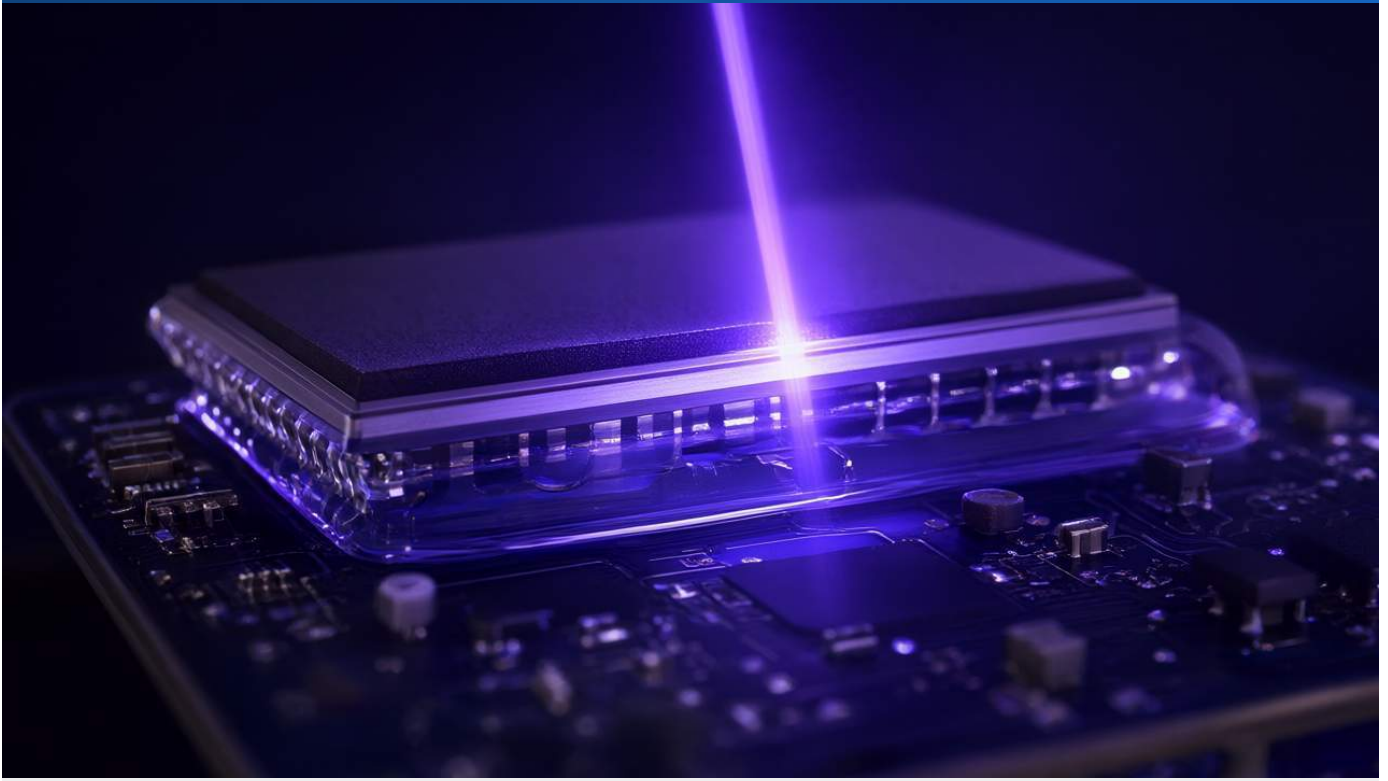
Heraeus's proposed improvements in silver sintering scalability are crucial for the mass production and cost-efficiency of next-generation power modules. This advancement is expected to accelerate widespread technological innovations, such as extending the range and shortening the charging times of electric vehicles, and enhancing the efficiency of renewable energy systems. Heraeus is anticipated to further strengthen its position as a key supplier in the power electronics industry through this technology, contributing to the development of higher-performance and more reliable modules.

Source: <https://www.3dincites.com/2026/09/precision-at-speed-silver-sintering-for-next-gen-power-module/>

Collected: September 26, 2026 | Automated Research System (Gemini API)

#09 YINCAE UF 66UV/88UV: UV-curable underfill specs for 2026

Published September 22, 2026 YINCAE (via Electronics Media) USA



OVERVIEW

YINCAE unveiled its UV-curable underfill technologies, UF 66UV and UF 88UV, at IMAPS 2026. UF 66UV offers high-speed processing and robust reliability for advanced electronic packaging. Notably, UF 88UV provides nearly 100% visible light transparency, room-temperature flowability, and exceptional reliability, with no delamination observed after five 260°C reflow cycles post-PCT. These solutions are pivotal for meeting stringent optical and mechanical demands in high-performance semiconductor packages like chiplets and 3D-ICs.

Key Findings

YINCAE announced its participation in IMAPS 2026, where it will showcase its innovative UV-curable underfill technologies, "UF 66UV" and "UF 88UV." These materials are poised to be critical enablers for achieving both high performance and high reliability in next-generation electronic packaging. The "UF 88UV", in particular, stands out for its exceptional optical properties and robust reliability under harsh environmental conditions, drawing significant industry attention.

Technical Details

- **UF 66UV:** This UV-curable underfill is characterized by its rapid processing capability and high reliability. It is engineered for advanced electronic packaging applications, especially flip-chip and chiplet integrations, to mitigate thermal stress and enhance the reliability of solder joints. Its UV curing mechanism allows for short processing times, contributing to increased production efficiency.
- **UF 88UV:** An advanced optical underfill offering unique properties:
 - **Nearly 100% Visible Light Transmission:** Ideal for applications demanding high transparency, such as optical sensors and optical communication devices.
 - **Room Temperature Flowability:** Facilitates easy filling into fine gaps of complex package structures, enhancing application process flexibility.
 - **Post-Cure Fluorescence:** Simplifies defect detection and quality control through visual inspection, improving efficiency on the production line.
 - **Exceptional Reliability:** A particularly noteworthy feature is its extremely high reliability, demonstrated by the absence of delamination even after five reflow cycles at 260°C following accelerated stress testing (PCT). This is a critical metric for applications in demanding environments such as automotive, aerospace, and high-performance computing.

Background and Industry Context

Facing the limitations of Moore's Law, semiconductor packaging technology is transitioning towards advanced solutions like chiplet integration, 3D-IC stacking, and fan-out packaging. These technologies critically depend on high-performance underfill materials to protect minuscule interconnections, alleviate thermal stress, and ensure high reliability. UV-curable underfills, with their rapid curing speeds, significantly contribute to reducing production cycle times, directly leading to lower manufacturing costs and increased productivity.

Furthermore, the evolution of optical devices has driven demand for underfills with high visible light transmission. Products like YINCAE's UF 88UV address these market requirements and are expected to contribute to the realization of next-generation optical interconnects and sensor technologies.

Strategic Significance and Outlook

The UV-curable underfill technologies offered by YINCAE represent a significant step in meeting the demand for high-performance materials in the advanced packaging market. The superior optical properties and reliability of UF 88UV, in particular, are expected to expand into new application areas, such as the development of optoelectronic convergence technologies and thermal management solutions for high-performance optical modules in AI data centers. As these technologies move towards mass production, they are anticipated to accelerate the miniaturization, performance enhancement, and increased reliability of semiconductor devices, contributing to the evolution of various electronic equipment.

Source: <https://www.electronicshmedia.info/2026/09/22/yincae-uf-66uv-uv-curable-underfill/>

Collected: September 26, 2026 | Automated Research System (Gemini API)

#10 Brewer Science: Laser release material for 350°C processes

Published September 24, 2026 Brewer Science USA



OVERVIEW

Brewer Science will present new data at IMAPS 2026 on a high-temperature-stable laser release material, designed for advanced packaging processes from 250°C to 350°C. This material supports demanding processes like PECVD, hybrid bonding, and silver sintering. The TBDB system, combined with BrewerBOND® C1301 series adhesives, maintains structural integrity up to 350°C and enables efficient UV laser debonding with easy solvent cleanup, critical for next-generation semiconductor manufacturing.

Key Findings

Brewer Science is set to unveil new data at IMAPS 2026 on a high-temperature-stable laser release material, specifically engineered to withstand and perform in advanced semiconductor packaging processes operating at 250°C to 350°C. This breakthrough material addresses a critical need for robust temporary bonding and debonding solutions in high-thermal budget manufacturing environments.

Technical Details

The new laser release material is designed to be compatible with challenging high-temperature processes such as plasma-enhanced chemical vapor deposition (PECVD), hybrid bonding, silver sintering, and thermocompression bonding. It forms a core component of the Temporary Bond/Debond (TBDB) system. When paired with BrewerBOND® C1301 series adhesives, this system demonstrates exceptional structural integrity even after exposure to process temperatures up to 350°C.

Furthermore, it exhibits reliable debonding performance when subjected to 308nm and 355nm UV laser wavelengths. Post-debonding, the material facilitates a straightforward, solvent-based cleanup process, ensuring minimal residue and a pristine surface for subsequent manufacturing steps.

Background & Context

The relentless drive towards higher performance, increased integration, and miniaturization in semiconductor devices, particularly for AI, HPC, and automotive applications, necessitates more sophisticated packaging technologies. These advanced packaging schemes often involve multiple high-temperature processing steps that can degrade conventional temporary bonding materials. The inability of existing materials to maintain mechanical stability or to debond cleanly at elevated temperatures has created a significant bottleneck in manufacturing yield and reliability. Brewer Science's innovation directly tackles this challenge, enabling wider adoption of advanced packaging techniques.

Strategic Significance & Outlook

This high-temperature-stable laser release material offers substantial advantages for the semiconductor industry by enabling the robust and reliable production of next-generation devices. By overcoming thermal limitations, it facilitates more complex 3D stacking and heterogeneous integration, which are crucial for enhancing computational power and energy efficiency. The improved process compatibility and clean debonding also contribute to higher manufacturing yields and reduced costs. Brewer Science's continued commitment to materials innovation positions it as a key enabler for the future evolution of semiconductor technology, supporting the development of advanced microelectronics across various high-growth sectors.

Source: <https://www.brewerscience.com/news-imaps-2026/>

Collected: September 26, 2026 | Automated Research System (Gemini API)

#11 SEMICON West 2026: 4 startup specs for hBN and 3D SRAM

Published September 23, 2026 SEMI USA



OVERVIEW

Four finalists from SEMI Startups for Sustainable Semiconductors presented groundbreaking innovations at SEMICON West 2026. HEXAspec Inc. achieved a 10x improvement in thermal conductivity with hBN nanosheet-polymer encapsulation. CHIPADD, Corp. introduced ultra-efficient, directly manufactured copper cooling for GPUs/CPUs, including robust bonding materials. K1 Semiconductor showcased a patented thin-layer wafer splitting method, while FS2 developed a monolithic 3D integration platform for stacked 3D SRAM, promising significant advancements in semiconductor performance and sustainability.

Key Findings

At SEMICON West 2026, the SEMI Startups for Sustainable Semiconductors program highlighted four innovative companies presenting solutions to critical industry challenges. Key advancements include HEXAspec Inc.'s high-thermal-conductivity encapsulation, CHIPADD, Corp.'s direct-printed copper cooling, K1 Semiconductor's novel wafer splitting, and FS2's monolithic 3D integration for SRAM.

Technical Details

- **HEXAspec Inc. – Advanced Encapsulation Molding Materials:** HEXAspec has developed a new encapsulation molding material leveraging hexagonal boron nitride (hBN) nanosheets within a polymer matrix. This material achieves a thermal conductivity 10 times higher than conventional options while preserving essential electrical insulation and mechanical strength. This innovation is crucial for managing the increasing heat density in advanced semiconductor packages.
- **CHIPADD, Corp. – Ultra-Efficient Copper Cooling:** CHIPADD introduced a technology for directly additive manufacturing ultra-efficient copper cooling features onto the surfaces of high-power chips like GPUs and CPUs. This process includes robust bonding materials to ensure durable adhesion and efficient heat transfer, significantly enhancing thermal dissipation at the chip level and pushing performance boundaries for AI and high-performance computing (HPC) applications.
- **K1 Semiconductor – Patented Wafer Splitting Method:** K1 Semiconductor presented a patented method for cleaving thin layers from high-quality single-crystal parent wafers. This technique enables the production of thinner, more flexible custom semiconductor wafers, offering new design possibilities for 3D stacking and heterogeneous integration, which are vital for compact and powerful devices.
- **FS2 – Monolithic 3D Integration Platform:** FS2 showcased a monolithic 3D integration platform and memory designed for building next-generation stacked 3D SRAM and process-on-memory architectures. This platform aims to minimize the physical distance between memory and logic, thereby reducing data transfer latency and power consumption, addressing key bottlenecks in advanced computing systems.

Background & Context

The semiconductor industry faces dual pressures: the physical limits of Moore's Law scaling and the growing imperative for sustainable manufacturing practices. Innovations in materials science, thermal management, and advanced packaging are therefore paramount. The SEMI Startups for Sustainable Semiconductors program serves as a critical platform to foster and promote companies offering groundbreaking solutions in these areas. The presented technologies reflect a holistic approach to improving semiconductor performance, efficiency, and environmental footprint.

Strategic Significance & Outlook

The technologies introduced by these startups are poised to play a significant role in shaping the future of semiconductor manufacturing. HEXAspec and CHIPADD's thermal management solutions will be instrumental in unlocking higher performance in AI and HPC processors by mitigating thermal throttling and reducing power consumption. K1 Semiconductor's wafer technology could accelerate the development of more compact and higher-performing 3D stacked devices. FS2's monolithic 3D integration offers a pathway to fundamentally alter computing architectures by resolving data bottlenecks. Collectively, these innovations promise to enhance the competitiveness of the semiconductor industry and drive a more sustainable technological evolution across various high-growth sectors.

Source: <https://www.semi.org/en/blogs/finalists-for-semi-startups-for-sustainable-semiconductors-to-present-live-pitches-at-semicon-west-2026>

Collected: September 26, 2026 | Automated Research System (Gemini API)

#12 Indium Corporation: AI/HPC TIM materials explained for IMAPS

Published September 25, 2026 3D InCites USA



OVERVIEW

Indium Corporation experts will present advanced materials solutions for advanced packaging, AI, and high-performance computing (HPC) at the IMAPS Symposium. Solutions include ultra-low residue flux for micro-bump wafer bumping, mid-temperature solder pastes to eliminate head-in-pillow (HIP) defects, and advanced thermal interface materials (TIMs) to significantly enhance HPC chip thermal efficiency. Notably, the Bismuth-free, Indium-containing low-temperature solder 'DFLT' is shown to mitigate warp-related defects in large BGA assemblies and improve drop-shock and electromigration performance.

Key Findings

Experts from Indium Corporation are scheduled to present a suite of innovative materials solutions at the IMAPS Symposium, targeting advanced packaging, artificial intelligence (AI), and high-performance computing (HPC) applications. These presentations will highlight significant advancements in thermal management, soldering processes, and defect reduction, aiming to enhance the reliability and efficiency of next-generation high-performance devices.

Technical Details

The primary solutions to be showcased by Indium Corporation include:

- **Ultra-Low Residue Flux Materials:** Developed for micro-bump wafer bumping and chip-on-wafer processes, these materials minimize flux residue, thereby reducing post-process cleaning requirements and enhancing connection reliability.
- **Mid-Temperature Solder Pastes:** Engineered to effectively eliminate common solder joint defects such as Head-in-Pillow (HIP) and Non-Wetting Open (NWO). This improves solder joint quality and reliability, leading to higher manufacturing yields.
- **Advanced Thermal Interface Materials (TIMs):** Specifically designed to dramatically improve the thermal efficiency of High-Performance Computing (HPC) chips. Given the high heat densities in HPC, efficient heat transfer is crucial for performance and lifespan.
- **Bismuth-Free, Indium-Containing Low-Temperature Solder 'DFLT':** A particularly noteworthy offering, the DFLT solder has demonstrated its ability to mitigate warp-related defects often observed in large Ball Grid Array (BGA) assemblies. Furthermore, DFLT has been proven to enhance drop-shock reliability and electromigration performance, making it ideal for applications requiring high robustness.

These materials are formulated with precise chemical compositions and microstructure control to address the complex challenges inherent in advanced semiconductor packaging.

Background & Context

The rapid evolution of AI and HPC has fueled an explosive demand for semiconductor devices capable of processing data at higher speeds and volumes. This trend has led to increased chip power densities and greater complexity in advanced packaging technologies. Inefficient thermal management and unreliable solder joints are primary contributors to device performance degradation and failure, making breakthroughs at the material level indispensable. Indium Corporation's solutions aim to resolve these technical bottlenecks, thereby enabling the realization of next-generation computing platforms.

Strategic Significance & Outlook

The materials solutions presented by Indium Corporation are expected to play a critical role in enhancing competitiveness within the AI and HPC markets. Low-temperature solders like DFLT, in particular, will improve manufacturing yields and reliability for large and complex packages, accelerating time-to-market for end products. Advanced TIMs will provide greater thermal design flexibility for high-performance chips, facilitating further performance enhancements. These technologies are anticipated to contribute to Indium Corporation's market share growth across a wide range of applications demanding high density and reliability, including data centers, automotive electronics, and smartphones.

Source: <https://www.3dincites.com/2026/09/indium-corporation-experts-to-present-advanced-packaging-ai-and-high-performance-computing-materials-solutions-at-imaps-symposium/>

Collected: September 26, 2026 | Automated Research System (Gemini API)