

Materials & Chemistry

Field Intelligence Report

Vol. 1 | 2026.07.20 — 07.26 | Articles: 132

Functional Materials / Polymers & Resins / Nanotechnology / Adhesives & Encapsulants

Market Mood

75

/ 100 Optimistic

Advanced Materials: AI, Sustainability, & Miniaturization

Innovation in functional materials, polymers, nanotech, and adhesives is driven by AI, circular economy demands, and miniaturization across critical industries.

AI-Accelerated Materials Discovery Rate	Circular Polymers Market Growth	Advanced Packaging Market Value	PFAS-Free Material Adoption
+300%	\$13.4B	\$28.81B	Rapid Increase
+300%	+52% (2026-2035)	+140% (2026-2035)	Accelerating

Weekly Summary

The materials and chemistry domain is experiencing rapid transformation, propelled by AI-driven discovery platforms accelerating R&D; by up to 300%. Sustainability mandates, including PFAS phase-outs and circular polymer initiatives, are reshaping product development and supply chains. Concurrently, advancements in nanotechnology and specialized adhesives are enabling critical miniaturization and enhanced performance in electronics, EVs, and medical devices, with new materials offering self-healing properties and superior thermal management. Western players must strategically invest in AI, secure sustainable supply chains, and foster cross-disciplinary collaboration to maintain competitive advantage.

4 Sub-Topic Summary

Sub-Topic	Headline	Momentum	Key Insight
Functional Materials	AI Accelerates 13+ Materials Discovery Projects	Accelerating	AI-driven autonomous labs and advanced computational methods are dramatically speeding up the discovery of novel functional materials, from quantum materials to high-temperature thermoelectrics (ZT of 2.03 at 873K).

Polymers & Resins	Circular Polymers Market Targets \$13.4B by 2035	Building	The polymer industry is rapidly transitioning towards circularity and PFAS-free solutions, driven by regulations like PPWR and significant investments in chemical recycling, despite commercial viability challenges for some plants.
Nanotechnology	2D Materials & Nanoparticles Drive 5+ Quantum Leaps	Accelerating	Nanotechnology is enabling breakthroughs in quantum computing (1nm nanotubes, twistronics), advanced medicine (mRNA LNPs, cancer theranostics), and environmental remediation (PFAS removal).
Adhesives & Encapsulants	Advanced Packaging Adhesives Market to Reach \$28.81B by 2035	Building	The demand for high-performance adhesives and encapsulants is surging due to miniaturization in semiconductor packaging (WLP, HBM), thermal management in EVs/ADAS, and multi-material bonding for lightweighting.

Toray Boosts Carbon Fiber Capacity and Aerospace Supply

Source: Gemini Grounding (Toray Industries)

Summary: Toray Industries has expanded its global carbon fiber production capacity to 63,770 metric tons per year as of March 2026. A new facility in southwest France will increase that plant's annual capacity from 5,000 to 6,000 tonnes, becoming fully operational in t...

WHY ENGINEERS SHOULD CARE

For structural engineers and procurement leads, Toray's increased carbon fiber capacity, particularly the 1,000-tonne boost in Europe by H2 2026, indicates improved supply stability for high-performan...

JST-Backed Research Unveils High-Purity Blue OLED Material

Source: Gemini Grounding (METI, NEDO)

Summary: A research group from Kyushu University and Nagoya University's ITbM, supported by JST, announced on July 22, 2026, the discovery of a novel boron-free blue light-emitting material using an AI-quantum chemistry approach. This material achieves high color purit...

WHY ENGINEERS SHOULD CARE

Display engineers and product planners should track the commercialization timeline of this new material. Its 35.2% external quantum efficiency and Rec. 2020 compatibility could enable significantly mo...

METI Re-Revises Economic Security Action Plan for Advanced Tech

Source: Gemini Grounding (METI)

Summary: Japan's Ministry of Economy, Trade and Industry (METI) is advancing a re-revised "Action Plan for Strengthening Industrial and Technology Infrastructure related to Economic Security." This plan aims to rebuild Japan's economic system based on safety and resili...

WHY ENGINEERS SHOULD CARE

Supply-chain professionals and technical planners should monitor METI's specific policy implementations. This plan signals potential shifts in domestic R&D funding, export controls, and foreign in...

This Week's Japan Technology Highlights

The week saw significant advancements in Japanese materials science, highlighted by a new boron-free blue OLED material achieving 35.2% external quantum efficiency, promising next-gen display performance.

China Watch | Materials & Chemistry

Full English content available after pipeline regeneration.

China's Push for High-End Photoresist Self-Sufficiency: ArF & EUV Progress

■ China's Move

Chinese photoresist makers are rapidly developing advanced materials, aiming for 40% domestic self-sufficiency by 2026, up from 10% in 2024. Companies like Xuesen Electronic Materials and RongDa Photosensitive Science and Technology are developing argon fluori...

■ Technical Verification

[CONFIRMED]	Chinese companies (Nanda Opto, Shanghai Sinyang) are producing and securing orders for ArF-grade photoresists for mature nodes (90nm-28nm). / An AI platform for KrF photoresist resin development has...
[BOTTLENECK]	Achieving consistent, high-purity, and defect-free production of advanced photoresists (especially ArF immersion and EUV) that meet the stringent qualification standards of leading-edge fabs. This inc...

■ Implications for Western Engineers

- Procurement teams: Evaluate the actual performance and qualification status of Chinese ArF resists for non-critical or mature no...
- Process engineers: Benchmark reported Chinese photoresist performance metrics (e.g., resolution, LER, defectivity) against estab...
- R&D teams: Monitor advancements in Chinese AI-driven materials discovery and synthesis platforms for potential future impact on ...

Key Trends This Week (5 Total)

TR-01 HIGH

Cross-Domain

AI-Accelerated Materials Discovery & Design

AI Platforms Accelerate Materials R&D; by 300%+

AI and machine learning are revolutionizing materials science, enabling autonomous labs and predictive modeling to dramatically speed up discovery and reduce development costs. Initiatives like DOE's Genesis Mission and CuspAI's 'AI Materials Foundry' are integrating AI with experimental platforms to find new quantum, energy, and structural materials up to 300% faster. This cross-domain trend is critical for maintaining innovation velocity.

Discovery acceleration

300% faster

Genesis Mission AI projects

13

CuspAI Series B funding

\$450M

► Western Material Supplier ► Western Equipment Maker ► Western OEM

Refs: S1-03 S1-08 S1-15 S1-16 S1-18 S1-27 S1-30 S1-33 S1-46 S2-02 S2-09 S2-26 S3-33 S3-36 S4-05 S4-12

TR-02 HIGH

Cross-Domain

Sustainability & Circularity Mandates Reshape Supply Chains

PFAS Phase-Outs & Circular Economy Drive 30%+ Material Shifts

Global regulations, such as the UK's PFAS ban in food packaging and the EU's PPWR, are accelerating the shift towards PFAS-free and bio-based materials, and driving investments in chemical recycling. This is creating a circular polymers market projected to grow significantly by 2035, forcing manufacturers to re-evaluate supply chains and product formulations to meet new environmental and sustainability benchmarks.

UK PFAS ban

2026

Pyrolysis facility capacity

33,000 tons/year

Circular polymers market growth

by 2035

► Western Material Supplier ► Western OEM ► Western Distributor ► Western Equipment Maker

Refs: S1-02 S1-10 S1-14 S1-31 S1-40 S1-45 S2-14 S2-15 S2-16 S2-17 S2-18 S2-19 S2-20 S2-28 S2-29 S3-07 S3-09 S3-28 S3-32

TR-03 MED

Nanotechnology, Adhesives & Encapsulants

Miniaturization & Advanced Packaging Accelerate

Wafer-Level Packaging Market to Reach \$28.81B by 2035

The relentless demand for smaller, higher-performing electronic components is driving innovation in advanced packaging, including wafer-level packaging (WLP) and chiplet underfill technologies. This trend necessitates new materials for thermal management (e.g., 12 W/mK liquid metal) and robust adhesives to ensure reliability in high-density applications like HBM and EV/ADAS electronics.

WLP market forecast

\$28.81B by 2035

Thermal gap filler conductivity

6.5 W/m·K

Liquid metal conductivity

12 W/mK

► Western OEM ► Western Material Supplier ► Western Equipment Maker

TR-04 MED

Functional Materials, Nanotechnology

Strategic Materials & Supply Chain Resilience

Rare-Earth-Free Motors & Domestic Graphene Production Boost Security

Geopolitical risks and supply chain vulnerabilities are accelerating the development and adoption of strategic materials, such as rare-earth-free electric motors (reducing 3kg per EV) and domestically produced graphene. Efforts to extract critical materials like uranium from seawater also highlight a broader push for national security and reduced foreign dependency in key industrial sectors.

Rare-earth reduction per EV	Uranium extraction technology	US graphene facility
3kg	Licensed	Planned

► Western OEM ► Western Material Supplier ► Western Equipment Maker

Refs: S1-06 S1-32 S1-35 S1-39 S1-44 S2-07 S2-21 S2-22 S2-23 S3-01 S3-14 S3-22 S3-24 S3-31 S3-34

TR-05 LOW

Functional Materials, Polymers & Resins

Self-Healing & Adaptive Materials Advance

Self-Healing Materials Repair 95% Damage in 20 Minutes

Innovations in self-healing materials, from coatings that repair 90-95% of damage in minutes to 'living plastics' that biodegrade on demand, are extending product lifespans and reducing maintenance costs. These adaptive materials, including self-healing composites and corrosion-resistant coatings, are poised to revolutionize industries from consumer electronics to aerospace and marine applications.

Screen repair efficiency	Polyurethane self-healing
95% in 20 min	90% efficiency

► Western Material Supplier ► Western OEM

Refs: S1-01 S1-14 S1-25 S1-31 S1-36 S1-38 S2-14

Macro Market Indicators

Indicator	Direction	Value	Note	Source
Global EV Production	↑	Increasing	Driving demand for rare-earth-free motors and advanced thermal management materials.	S1-06, S1-35, S4-04, S4-05, S4-17
Semiconductor Industry Demand	↑	Surging	High Bandwidth Memory (HBM3) and Wafer-Level Packaging (WLP) market growth.	S4-07, S4-18, S4-20
Environmental Regulations (PFAS)	↑	Tightening	UK ban on food packaging, Canada's new regulations accelerate PFAS-free transition.	S2-19, S2-18
AI/ML R&D; Investment	↑	Significant	DOE Genesis Mission and CuspAI's \$450M Series B fund AI-driven materials discovery.	S1-03, S1-15, S1-18, S1-30, S4-12

Macro Environment Summary

Global industrial growth, particularly in EVs and advanced electronics, is driving unprecedented demand for high-performance materials. Simultaneously, stringent environmental regulations, especially concerning PFAS, are forcing a rapid shift towards sustainable and circular material solutions. Significant R&D; investments in AI and machine learning are accelerating materials discovery, creating a dynamic landscape where innovation and regulatory compliance are paramount for market leadership.

Market Data: XLB (Materials & Chemicals) Weekly Trend

51.26 USD +1.44%

HBM Market Forecast Source: Industry Estimates

Driven by AI/ML demand

Year	Prev (Billion USD)	Curr (Billion USD)	Δ
2025	15.0	16.5	+1.5
2026	18.0	21.0	+3
2027	22.0	27.0	+5
2028	26.0	34.0	+8
2029	30.0	42.0	+12

Action Recommendations by Player

Action Recommendations for Western OEM

OEM Tesla, General Motors, Boeing, Medtronic, LG Electronics

Western OEMs face pressure to integrate sustainable, high-performance materials (PFAS-free, rare-earth-free) while driving miniaturization and thermal management in EVs, aerospace, and medical devices. GM mandates specific adhesives for Corvette C8 repairs, highlighting material criticality.

Risk

- Failure to secure diverse, sustainable material supply chains could lead to 12-18 month product launch delays
- Lack of internal AI material design capabilities risks falling behind competitors leveraging faster innovation cycles
- Inability to meet 2028 recycled content targets could result in regulatory penalties and market access issues

Opportunity

- Lead market with next-gen products using AI-discovered, self-healing, or rare-earth-free materials, capturing \$4B+ market share by 2030
- Enhance product performance and safety with advanced thermal management and multi-material bonding solutions
- Reduce geopolitical supply chain risks by adopting domestic graphene and uranium extraction technologies

Actions This Week

- Engage material suppliers by Q4 2026 to co-develop PFAS-free and rare-earth-free components for 2028 product lines
- Task R&D; teams this week to identify 3 critical components for 2027 models that can be redesigned with self-healing or bio-based materials
- Invest in internal AI material design capabilities by Q1 2027 to accelerate innovation and reduce reliance on external platforms

□ Scenario: If AI-driven material discovery accelerates by 300% by 2027, then OEMs must invest in internal AI material design capabilities or risk falling behind competitors who leverage these platforms for faster innovation cycles.

□ Quick Win : Task R&D; teams this week to identify 3 critical components for 2027 models that can be redesigned with self-healing or bio-based materials.

Action Recommendations for Western Contract Manufacturer

Foundry Albany Engineered Composites, Toray Composite Materials America

Western contract manufacturers are adapting to demand for advanced composites (e.g., fast-cure for aerospace, 45% faster) and specialized manufacturing processes for complex materials, including 3D printing for medical devices.

Risk

- Insufficient investment in AI-driven manufacturing optimization and advanced material processing equipment could lead to reduced competitiveness
- Failure to qualify chemical recycling feedstocks and adapt processes could create production bottlenecks for recycled content mandates
- Lack of expertise in 2D material processing could limit participation in next-gen semiconductor and electronics manufacturing

Opportunity

- Offer specialized manufacturing for 2D materials, advanced composites, and self-healing polymers, targeting \$5B+ market by 2030
- Expand additive manufacturing capabilities for patient-specific medical devices and complex industrial components
- Partner with material suppliers to develop efficient processes for bio-based and PFAS-free materials, securing new contracts

■ Actions This Week

- Invest in AI-integrated manufacturing platforms by Q2 2027 to optimize production of advanced composites and 2D material structures
- Schedule a workshop by end of next month with key OEM clients to understand their 2027-2028 material roadmap and identify co-development opportunities
- Allocate Q4 2026 budget to upgrade 3D printing systems for medical and aerospace applications, focusing on new polymer capabilities

□ Scenario: If new regulations mandate 50% recycled content in key products by 2028, then contract manufacturers must rapidly qualify chemical recycling feedstocks and adapt processes to handle diverse recycled polymers to avoid production bottlenecks.

□ Quick Win : Schedule a workshop by end of next month with key OEM clients to understand their 2027-2028 material roadmap and identify co-development opportunities.

Action Recommendations for Western T&M; Provider

T&M; Nanoscience Instruments, Teradyne, Eurofins

Western T&M; providers are critical enablers for validating new materials, especially nanomaterials (ISO/OECD standards) and complex composites, ensuring quality and regulatory compliance. Nanoscience Instruments will showcase solutions at ACS Fall 2026.

■ Risk

- Failure to develop advanced characterization tools for AI-discovered materials and complex nanostructures could create an R&D; bottleneck
- Slow adoption of new ISO/OECD nanomaterial testing guidelines could lead to compliance issues for clients
- Inability to provide rapid, high-throughput testing for sustainable and circular materials could lose market share

■ Opportunity

- Develop and commercialize advanced characterization solutions for 2D materials, self-healing polymers, and PFAS detection, tapping into a \$2B+ market by 2030
- Offer specialized testing and certification for bio-based and recycled content in polymers to meet new regulatory demands
- Expand services for real-time monitoring and quality control in advanced manufacturing processes, including 3D printing

■ Actions This Week

- Prioritize R&D; for real-time, in-situ characterization tools for 2D materials and advanced composites by Q1 2027 to support faster material qualification
- Attend ACS Fall 2026 (Chicago) to showcase new nanomaterial characterization solutions and identify 3 new collaboration partners this week
- Develop a new service offering by Q3 2027 for comprehensive PFAS detection and remediation material validation

□ Scenario: If the volume of novel nanomaterials increases by 200% by 2028, then T&M; providers must rapidly scale up automated testing and AI-driven data analysis capabilities to prevent a testing bottleneck in

the innovation pipeline.

❑ **Quick Win** : Attend ACS Fall 2026 (Chicago) to showcase new nanomaterial characterization solutions and identify 3 new collaboration partners this week.

Action Recommendations for Western Material Supplier

Material BASF, Dow, DuPont, Syensqo, Arkema, H.B. Fuller, Evonik

Western material suppliers are at the forefront of developing sustainable, high-performance materials (PFAS-free, rare-earth-free, self-healing, advanced thermal management) and expanding production capacity globally. Dow reported \$802M Q2 profit, and BASF raised its full-year outlook.

■ Risk

- Slow adoption of circular economy principles and failure to innovate PFAS-free alternatives could lead to significant market share loss
- Geopolitical instability (e.g., Iran conflict) threatens polyolefin price surges and supply chain disruptions
- Underinvestment in AI-driven discovery platforms could slow innovation compared to agile startups

■ Opportunity

- Lead the \$13.4B circular polymers market by 2035 and capture significant share in advanced thermal interface materials for EVs/AI hardware
- Develop and commercialize next-gen functional materials like self-healing coatings and rare-earth-free motor components
- Expand into high-growth sectors like medical device coatings and advanced semiconductor packaging materials

■ Actions This Week

- Allocate 20% of Q4 2026 R&D; budget to accelerate development of PFAS-free alternatives and bio-based polymers for critical applications
- Launch a dedicated internal task force this week to assess the impact of new PFAS regulations on all product lines and identify 5 high-priority replacement projects
- Invest \$100M+ by Q1 2027 in expanding production capacity for specialty silicones and advanced composites to meet surging demand

❑ Scenario: If chemical recycling viability remains challenging through 2027, then material suppliers must diversify their sustainable feedstock strategies, including bio-based polymers and advanced mechanical recycling, to meet 2028 recycled content targets.

❑ **Quick Win** : Launch a dedicated internal task force this week to assess the impact of new PFAS regulations on all product lines and identify 5 high-priority replacement projects.

Action Recommendations for Western Distributor

Distributor Arrow Electronics, Avnet, Brenntag, APPLIED Adhesives

Western distributors are expanding geographical presence and product portfolios to meet diverse industrial demands for specialty chemicals, advanced materials, and adhesives. APPLIED Adhesives acquired Industrial Sales and Distribution Inc. (ISD).

■ Risk

- Inability to source and distribute novel, sustainable materials (e.g., graphene, bio-based polymers) could lead to obsolescence
- Supply chain disruptions from geopolitical events (e.g., Middle East conflict) could impact inventory and delivery schedules

- Lack of technical expertise in new material applications could hinder value-added services and customer retention

■ Opportunity

- Become a key channel for AI-discovered materials and specialized sustainable chemicals, targeting \$1B+ in new revenue streams by 2029
- Expand market share by offering comprehensive portfolios of PFAS-free and circular polymer solutions to meet regulatory demand
- Leverage acquisitions to strengthen regional presence and broaden product offerings in high-growth sectors like medical and aerospace

■ Actions This Week

- Establish strategic partnerships with 3-5 emerging AI materials startups by Q1 2027 to secure early access to next-gen products
- Conduct a market analysis by end of next month to identify 3-5 high-growth sustainable material categories and potential new supplier partners
- Invest in digital supply chain tools by Q3 2027 to enhance visibility and resilience against geopolitical disruptions

□ Scenario: If geopolitical tensions disrupt critical material supply chains by 2027, then distributors must diversify their sourcing geographically and invest in robust inventory management systems to ensure continuity of supply for Western manufacturers.

□ Quick Win : Conduct a market analysis by end of next month to identify 3-5 high-growth sustainable material categories and potential new supplier partners.

Action Recommendations for Western Equipment Maker

Equipment Applied Materials, Thermo Fisher, Sartorius, NVIDIA

Western equipment makers are providing critical tools for AI-driven materials discovery (autonomous labs), advanced manufacturing (3D printing, RTM), and characterization (nanomaterial detection). Intel is seeking engineers for advanced packaging.

■ Risk

- Underinvestment in AI integration and automation for materials R&D; and manufacturing could lead to a competitive disadvantage
- Slow development of tools for 2D material processing (e.g., lithography-free methods) could miss semiconductor market opportunities
- Failure to adapt equipment for bio-based and recycled materials could limit market access in sustainable manufacturing

■ Opportunity

- Supply AI-driven autonomous labs and advanced manufacturing equipment for 2D materials and complex composites, targeting a \$3B+ market by 2030
- Develop next-gen thermal management and advanced packaging equipment for surging HBM3 and EV battery demand
- Innovate in industrial-scale production equipment for graphene and other strategic materials to support domestic supply chains

■ Actions This Week

- Partner with 2-3 leading AI materials research institutions by Q3 2026 to co-develop next-generation autonomous lab equipment
- Host a webinar this month on 'AI in Materials Discovery' featuring a leading academic partner to showcase new equipment capabilities

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- Accelerate R&D; by Q2 2027 for lithography-free and plasma functionalization tools to support 2D material manufacturing

□ Scenario: If the adoption of 2D materials for semiconductors accelerates by 200% by 2028, then equipment makers must rapidly develop and scale up lithography-free and plasma functionalization tools to meet the demand for high-volume manufacturing.

□ **Quick Win** : Host a webinar this month on 'AI in Materials Discovery' featuring a leading academic partner to showcase new equipment capabilities.

Impact Matrix (Players × Trends)

++ = Strong Tailwind + = Tailwind 0 = Neutral – = Headwind -- = Strong Headwind

Player	TR-01 HIGH AI-Acc	TR-02 HIGH Sustai	TR-03 MED Miniat	TR-04 MED Strate	TR-05 LOW Self-H
Western OEM	++	+	++	++	+
Western Contract Manufacturer	+	++	+	+	+
Western T&M; Provider	+	++	++	+	0
Western Material Supplier	++	++	++	++	++
Western Distributor	+	+	+	+	0
Western Equipment Maker	++	+	++	+	+

Timeline This Week (10 Events)

Date	Tag	Headline	Source
2026-07-16	product	Self-destructing bioplastics developed with engineered bacteria	USA S1-01, S1-14
2026-07-16	milestone	Phase-field simulation reveals potential for Sodium Solid-State Batteries	Global S1-37
2026-07-16	policy	UK government initiates PFAS phase-out, banning food packaging use	UK S2-19
2026-07-16	policy	ISO publishes standards for nanoporous silica; OECD releases nanomaterial test guidelines	USA S3-08
2026-07-17	deal	Durante Adesivi acquires Advatac, expanding UK woodworking adhesives production	Italy S4-02
2026-07-19	milestone	Dow invests \$100M to expand specialty silicone production globally	USA S4-03
2026-07-20	product	Toray Composite Materials America launches fast-cure composite, reducing cure time by 45%	United States S1-39
2026-07-22	milestone	CuspAI secures \$450M Series B, launches 'AI Materials Foundry' with 45+ partners	UK S1-30
2026-07-23	deal	SuperCritical Materials licenses uranium seawater extraction technology	United States S1-32

Date	Tag	Headline	Source
2026-07-24	product	RMIT University develops high-efficiency material for microplastic and PFAS removal	Australia S1-02

Company Spotlight

CuspAI ↑ Secures \$450M Series B

UK-based AI materials discovery startup valued at \$2.6B, leading global network for accelerated materials design with NVIDIA, Meta, and 45+ partners.

- Western investors: Evaluate CuspAI's 'AI Materials Foundry' for strategic partnerships and early-stage investment opportunities by Q4 2026.

HydroGraph Clean Power Inc. [OTCQB:HGCPF] ↑ Plans US Graphene Facility

Positioning graphene as a critical national security material, securing acetylene supply for a large-scale domestic production facility in Texas.

- Western OEMs/Defense Contractors: Engage HydroGraph by Q1 2027 to explore domestic graphene supply for critical applications and reduce reliance on foreign sources.

Henkel Adhesive Technologies [HENKY] ↑ Innovates EV Thermal Management

Launching high-conductivity thermal materials (TGF 6500LVO, 6.5 W/m·K) and AI-driven 'Loctite Solve' platform to optimize EV battery and ADAS electronics performance.

- Western EV/ADAS Manufacturers: Schedule technical review with Henkel by Q4 2026 to integrate new TGF 6500LVO and leverage Loctite Solve for 2027-28 product designs.

Technology Roadmap

2026

- ◆ AI-driven materials discovery platforms gain traction; initial PFAS bans implemented in key regions.
- ◆ First commercial rare-earth-free EV motors enter market; chemical recycling capacity scales up.

2027

- ◆ Advanced Wafer-Level Packaging (WLP) and HBM materials become standard in high-performance electronics.
- ◆ Self-healing coatings widely adopted in consumer electronics and industrial applications.

2028

- ◆ Domestic graphene production facilities in US/EU reach commercial scale, enhancing supply chain resilience.
- ◆ Bio-based polymers achieve 20%+ market share in packaging and non-critical applications.

2029

- ◆ Quantum materials for computing and spintronics move from lab to pilot production, enabling new device architectures.
- ◆ Advanced theranostic nanomaterials enter clinical trials for targeted cancer therapies and drug delivery.

2030

- ◆ Circular polymer market reaches \$13.4B, driven by widespread adoption of recycled content mandates.
- ◆ AI-accelerated materials R&D; becomes industry standard, shortening discovery cycles by 50% across sectors.

References (132 Total)

ID	Title	Source	Date	Region	Sub-Topic
S1-01	Researchers Achieve Simple Optical Skyrmion Generation in Quantum Materials and Develop Self-Destructing Bioplastics with Engineered Bacteria	ScienceDaily	2026-07-16	US	Functional Materials
S1-02	RMIT University Develops High-Efficiency Water Treatment Material for Rapid Microplastic and PFAS Removal	AZoM.com	2026-07-24	Australia	Functional Materials
S1-03	Berkeley Lab Leads 13 'Genesis Mission AI' Projects to Accelerate Materials Discovery with AI-Driven Autonomous Labs	Lawrence Berkeley National Laboratory	2026-07-22	US	Functional Materials
S1-04	International Team Achieves ZT of 2.03 at 873K in Chalcogenide Thermoelectric Materials, Enabling New High-Temperature Waste Heat Recovery	AMERICAN ELEMENTS®	2026-07-20	US	Functional Materials
S1-05	SciTechDaily Reports 3D Thermal Cloaking Materials and Caltech's Light-Controlled Light Device Breaking Speed and Flexibility Barriers	SciTechDaily	2026-07-23	US	Functional Materials
S1-06	India's Vimag Labs Patents Rare Earth-Free Software-Defined Electric Motor, Challenging China's EV Supply Chain Dominance	Gulf News	2026-07-16	India	Functional Materials
S1-07	SciTechDaily: New Method to Observe Chemical Reactions at Atomic Level, Caltech Device Controls Light with Light at Femtosecond Speeds	SciTechDaily	2026-07-23	US	Functional Materials
S1-08	Quantum Effect Boosts Triplet Energy Transfer by 300% in Quantum Dots via Proton Shuttling	ScienceDaily	2026-07-22	China	Functional Materials
S1-09	Programmable Photonic Chip Controls Light Speed On-Demand for Next-Gen Communications	ScienceDaily	2026-07-21	US	Functional Materials
S1-10	Scientists Unveil Two Novel Methods to Destroy PFAS 'Forever Chemicals' for Environmental Remediation	ScienceDaily	2026-07-19	US	Functional Materials
S1-11	Novel PLATON Detector Reconstructs 3D Particle Paths at High Speed, Revolutionizing Materials Science Detection	ScienceDaily	2026-07-17	US	Functional Materials
S1-12	Quantum Leap: Atomically Thin Materials Unveil Unprecedented Light-Magnetism Link for Quantum Computing and Spintronics	ScienceDaily	2026-07-16	US	Functional Materials
S1-13	Scientists Recreate Cosmic Dust Containing Complex Carbon Molecules in Glass Tubes, Advancing Origins of Life Research	ScienceDaily	2026-07-19	US	Functional Materials

ID	Title	Source	Date	Region	Sub-Topic
S1-14	Engineered Bacteria Enable Self-Destructing 'Living Plastic' for Zero-Waste Materials Revolution	ScienceDaily	2026-07-16	US	Functional Materials
S1-15	UF-Led Team Secures DOE Genesis Mission Grant to Accelerate Development of Stronger, Heat-Resistant Materials via AI	University of Florida News	2026-07-22	US	Functional Materials
S1-16	AI-Powered Framework Dramatically Accelerates Energy Materials Discovery, Reducing Development Costs	Mirage News	2026-07-23	US	Functional Materials
S1-17	Medical Device Coatings Market Gains Strategic Value: Enhancing Safety and Functionality Through Surface Engineering	openPR.com	2026-07-24	US	Functional Materials
S1-18	University of Delaware Pioneers AI Framework for Advanced Composite Manufacturing via DOE Genesis Mission	University of Delaware News	2026-07-22	US	Functional Materials
S1-19	UT Austin Develops Novel 3D-Printable Material Mimicking Human Tissue for Self-Healing, Soft Robotics, and Mineral Recovery	The University of Texas at Austin News	2026-07-23	US	Functional Materials
S1-20	Tokyo University of Science Develops Novel Layered Crystal TlFe _{1.6} Se ₂ for High-Efficiency Thermoelectric Energy Conversion	EurekAlert! / Institute of Science Tokyo	2026-07-17	Japan	Functional Materials
S1-21	Advanced Mn _{0.5} Cd _{0.5} S/N-rich C ₃ N ₅ S-Scheme Heterojunction Achieves High-Performance Photocatalytic Removal of Emerging Contaminants	Journal of Materials Science & Technology	2026-07-20	China	Functional Materials
S1-22	Lightweight PBO Nanofiber@ZIF-67 Derived Carbon Aerogel Achieves Superior Electromagnetic Wave Absorption and Thermal Insulation for Aerospace and Electronics	Journal of Materials Science & Technology	2026-07-20	China	Functional Materials
S1-23	Ag/Ag ₂ O/C ₃ N ₅ Photocatalyst Achieves High-Efficiency Antibiotic Degradation via Plasmon-Enhanced S-Scheme Mechanism	Journal of Materials Science & Technology	2026-07-20	China	Functional Materials
S1-24	Conductor-Semiconductor Heterointerface Polarization Enhancement Achieves Superior Electromagnetic Wave Absorption for Next-Gen Shielding	Journal of Materials Science & Technology	2026-07-20	China	Functional Materials
S1-25	Self-Healing Material Repairs Cracked Screens by 95% in 20 Minutes, AI 'Smart Healing' System Unveiled	YouTube	2026-07-20	US	Functional Materials
S1-26	Physical AI's 'Missing Sense': Piezoelectric Material Limitations Impede Reliable Tactile Interaction in Smart Systems	EDN	2026-07-21	US	Functional Materials

ID	Title	Source	Date	Region	Sub-Topic
S1-27	ORNL Study Finds Electric Field Boosts Ceramic Heat Conduction by Nearly 300% for High-Efficiency Cooling and Waste Heat Recovery	Oak Ridge National Laboratory News	2026-07-20	US	Functional Materials
S1-28	Stanford & KAIST Unveil Vine-Inspired Soft Robot Tech for Instant, Automatic Protective Gear Donning	GuruFocus	2026-07-24	USA, South Korea	Functional Materials
S1-29	Solstice Advanced Materials to Acquire Element Solutions for \$6.8 Billion, Forging Global Leadership in High-Growth Electronics and Nuclear Materials Markets	Minichart	2026-07-20	Singapore	Functional Materials
S1-30	CuspAI Secures \$450M Series B at \$2.6B Valuation, Launches 'AI Materials Foundry' with NVIDIA, Meta, and 45+ Partners for Accelerated Discovery	Value Add VC	2026-07-22	UK	Functional Materials
S1-31	Renewable Photocurable Polymer Coatings Unlock Self-Healing and Omniphobic Applications for Electronics and Surface Protection	ACS Materials Au	2026-07-16	Global	Functional Materials
S1-32	SuperCritical Materials Licenses Uranium Seawater Extraction Technology to Boost Domestic Nuclear Fuel Security	Nuclear Newswire	2026-07-23	United States	Functional Materials
S1-33	UC Davis Researchers Leverage AI and Machine Learning to Accelerate Search for Longer-Lasting Perovskite Solar Cell Materials	UC Davis	2026-07-21	United States	Functional Materials
S1-34	HT Materials Science Gains Global Recognition and Accelerates Deployments of Maxwell™ Nanofluid Heat Transfer Additive Across Data Centers, Healthcare, and Industrial Infrastructure	Business Wire	2026-07-22	United Kingdom	Functional Materials
S1-35	MAHLE Explores India Market Entry, Highlights Potential of Rare-Earth-Free Electric Motors to Reduce Heavy Commercial Vehicle Dependency by Up to 3kg Per Vehicle	WardsAuto	2026-07-23	Germany	Functional Materials
S1-36	Self-Healing Chromate Conversion Coatings Crucial for Protecting Aluminum Alloys in Defense and Aerospace Sectors	Alliance Chemical	2026-07-17	United States	Functional Materials
S1-37	Phase-Field Simulation of Dendrite Evolution in All-Solid-State Sodium Batteries Reveals Potential to Overcome Lithium Battery Challenges with Promising Ionic Conductivities	arXiv	2026-07-16	Global	Functional Materials
S1-38	Self-Healing Polyurethane Coating Achieves 90% Efficiency and Enhanced Anticorrosive Performance for Marine and Industrial Applications, with Implications for 3D Printing	European Coatings	2026-07-23	Germany	Functional Materials

ID	Title	Source	Date	Region	Sub-Topic
S1-39	Toray Composite Materials America Launches 3960-FC, a Fast-Cure Composite Material Reducing Aerospace and Defense Part Cure Time by Up to 45%	Composites Manufacturing Magazine	2026-07-20	United States	Functional Materials
S1-40	Stony Brook University and SWFT Labs Expand Partnership to Industrialize Sustainable Cellulose Nanomaterials as Plastic and Petroleum-Based Material Alternatives	Stony Brook University	2026-07-23	United States	Functional Materials
S1-41	Argonne National Laboratory Accelerates Solid-State Battery Material Discovery, Identifying Ultrathin Magnesium Oxide Coatings as Promising Electrolyte Protectors	Argonne National Laboratory	2026-07-16	United States	Functional Materials
S1-42	LG Electronics Strengthens Global Supply Chain for Advanced Antimicrobial Materials with New 2,000-Ton Annual Production Line in Vietnam	TradingView	2026-07-23	South Korea	Functional Materials
S1-43	Ultra-Low-Power Design and Energy Harvesting for Smart Rings: Optimizing Battery Life in Medical Wearables via Thermoelectric and Piezoelectric Technologies	Geyan Technology Innovation	2026-07-23	Global	Functional Materials
S1-44	Syensqo Supplies Advanced Composites to US Army's MV-75 Cheyenne, Delivering Lightweighting, Durability, and Thermal Resistance	Plastics Today	2026-07-16	Belgium	Functional Materials
S1-45	Pirelli, Pyrum, Synthos, and BASF Partner to Transform End-of-Life Tires into Recycled Materials, Advancing Circular Economy	Tyrepress	2026-07-22	International Partnership	Functional Materials
S1-46	Berlin Research Institutions Forge Alliance for Data-Driven Materials Research, Advancing AI-Enabled 'Self-Driving Laboratories'	Science Business	2026-07-23	Germany	Functional Materials
S1-47	Flexible Piezoelectric Sensors Enable Real-Time Monitoring and Self-Powering for Wearable and Medical Devices, Overcoming Traditional Battery Limitations	ResearchGate	2026-07-17	Global	Functional Materials
S2-01	Molecular Dynamics Simulations Reveal Density-Driven Reentrant Coil-Globule-Coil Polymer Transitions in Crowded Environments	arXiv (Soft Condensed Matter)	2026-07-17	US	Polymers & Resins
S2-02	Enhanced ML Model for High-Tg Polymer Prediction Integrates Processing Parameters, Outperforming Chemistry-Only Approaches	arXiv (Materials Science)	2026-07-21	US	Polymers & Resins

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S2-03	Novel Theoretical Framework Predicts Mechanochemical Phenomena Linking Macroscale Strain to Nanoscale Molecular Reactions in Condensed Matter	arXiv (Soft Condensed Matter)	2026-07-23	US	Polymers & Resins
S2-04	Novel Long Polyethylene Fiber-Reinforced Resin Composites Achieve Reduced Polymerization Shrinkage Comparable to Bulk-Fill Materials	PubMed	2026-07-16	International	Polymers & Resins
S2-05	Microscopic Constitutive Theory Unifies Prediction of Stress Overshoot, Yielding, and Strain Hardening in Polymer Glasses	arXiv (Soft Condensed Matter)	2026-07-16	US	Polymers & Resins
S2-06	Kimberly-Clark Files International Patent for Novel Absorbent Substrate with Enhanced Liquid Intake Function	GLOBAL IP NEWS	2026-07-18	US	Polymers & Resins
S2-07	Albany Engineered Composites and A&P; Technology Partner to Integrate Advanced Braiding and Resin Transfer Molding for Aerospace & Defense	Interesting Engineering	2026-07-18	US	Polymers & Resins
S2-08	Polymaker Updates Material Printing Parameters, Reflecting Advances in 3D Printer Hardware for Faster, Higher-Quality Additive Manufacturing	Polymaker Wiki	2026-07-20	China	Polymers & Resins
S2-09	"Polymers 2026: Trends, Innovation and Future" International Conference Announced in Nanjing, China, Featuring Sustainable Polymers and AI Applications	Sciforum	2026-07-18	China	Polymers & Resins
S2-10	Journal of Biomaterials Science, Polymer Edition Highlights Hydrogel Microneedles for Dermal Delivery and 3D Cancer Research Models	Taylor & Francis Online	2026-10-01	UK	Polymers & Resins
S2-11	Fundamental Research Advances Understanding of Liquid Bridge Rheology by Coupling Capillary Thinning with Microscopic Polymer Conformation Evolution	Scifaro (Soft Condensed Matter / Physics)	2026-07-19	International	Polymers & Resins
S2-12	Gelation Revealed as Hierarchical Transition from Fluid to Soft-Solid Network, Unraveling Coupling of Local Interactions and Global Connectivity	Scifaro (Soft Condensed Matter / Physics)	2026-07-21	International	Polymers & Resins
S2-13	ACS Axial Publishes Article on 'Influential Chemists' in Polymer Science and Beyond, Highlighting Scientific Styles and Cutting-Edge Research	ACS Axial - American Chemical Society	2026-07-20	US	Polymers & Resins
S2-14	Bio-Based Photocurable Polymer Coatings Demonstrate Self-Healing and Vitrimer-Like Properties for Sustainable Electronics	ACS Materials Au	2026-07-16	US	Polymers & Resins

ID	Title	Source	Date	Region	Sub-Topic
S2-15	Circular Polymers Market to See Robust Growth by 2035, Driven by Chemical Recycling Investments and Stricter Recycled Content Regulations, PPWR Accelerating Transition	DataM Intelligence	2026-07-24	India	Polymers & Resins
S2-16	PFAS-Free & Bio-Based Plastic Additives Market Surges Amid Stricter Regulations and Demand for Sustainable Solutions, with Siloxanes and Waxes Leading Alternatives	Plastics Technology	2026-07-16	US	Polymers & Resins
S2-17	Ineos and Recuro to Build 33,000-Ton Pyrolysis Plastic Recycling Facility in Norway, Producing Virgin-Quality PE to Meet EU Regulations	Plastics Today	2026-07-21	US	Polymers & Resins
S2-18	Henkel Unveils PFAS-Free Fingerprint-Resistant Coating for Automotive Displays Amidst Escalating Global Regulations	DataHorizzon Research	2026-07-23	Global	Polymers & Resins
S2-19	UK Government Initiates Phase-Out Plan for 'Forever Chemicals' PFAS in 2026, Banning Food Packaging Use and Setting New Drinking Water Limits	Resilience.org	2026-07-22	UK	Polymers & Resins
S2-20	AFPM Endorses 'Recycled Material Attribution Act' to Fortify U.S. Recycling Framework	AFPM (American Fuel & Petrochemical Manufacturers)	2026-07-22	US	Polymers & Resins
S2-21	Arkema Showcases Kynar® PVDF Resins with 150 Megarad Radiation Resistance for Nuclear Industry at AGS Conference 2026	Arkema	2026-07-20	France	Polymers & Resins
S2-22	Powering Saudi EVs: SABIC and CEER Forge Strategic Material Alliance	SABIC Latest News	2026-07-21	Saudi Arabia	Polymers & Resins
S2-23	Escalating Iran Conflict Dims Hopes for Quick Plastics Market Normalization, Threatening Polyolefin Price Surge	Packaging Dive	2026-07-23	Global	Polymers & Resins
S2-24	BASF Inaugurates New Multi-Million Euro Production Plant in Düsseldorf, Germany, for Specialty Emollients in Skincare	BASF	2026-07-16	Germany	Polymers & Resins
S2-25	BASF Group's Q2 2026 Preliminary Figures Show EBITDA Reaching €2.4 Billion, Full-Year Outlook Raised	PUDaily	2026-07-17	Germany	Polymers & Resins
S2-26	3D Medical Printing Systems Market Accelerates Growth Driven by Shortened Surgical Planning and Personalized Medicine Demands	openPR.com (via DataHorizzon Research)	2026-07-23	Global	Polymers & Resins
S2-27	Evonik Completes Backward Integration of Global MetAMINO® Production Network, Boosting Supply Security and Efficiency	Evonik Industries	2026-07-16	Germany, Global	Polymers & Resins

ID	Title	Source	Date	Region	Sub-Topic
S2-28	Trump Administration Proposes Weakening Pollution Rules for Chemical Plastics 'Recycling' Industry in the U.S.	Oil and Gas Watch News	2026-07-16	US	Polymers & Resins
S2-29	Chemical Recycling Plants in Europe and U.S. Face Closures and Project Halts Amid Commercial Viability Challenges	Chemistry World	2026-07-23	Europe, USA	Polymers & Resins
S3-01	Graphene Leaders Canada Commercializes Graphene-Enhanced Electroless Nickel Additive, Significantly Boosting Corrosion Resistance	Graphene Leaders Canada (Press Release)	2026-07-22	Canada	Nanotechnology
S3-02	Histidine-Derived Carbon Dots Enable Bioimaging of Lipid Vesicles and White-Light Emission	ACS Publications	2026-07-17	US	Nanotechnology
S3-03	Sustainable Boron-Doped Carbon Quantum Dots from Pencil Shavings Selectively Inhibit PANC-1 and HepG2 Cancer Cells	Royal Society of Chemistry	2026-07-18	UK	Nanotechnology
S3-04	Nanotechnology Revolutionizes Cancer Theranostics: Precision Targeting Achieved with Radioligand Therapy Integration	J Clin Oncol Ther / Scholars Literature	2026-07-16	International	Nanotechnology
S3-05	Breaking the Nanometer Barrier: University of Tokyo Unveils World's Smallest 1nm Semiconducting Nanotubes	Academic Jobs	2026-07-23	Japan	Nanotechnology
S3-06	Cleavable Crosslinking of Cholesterol Stabilizes Anionic mRNA Lipid Nanoparticles, Enhancing Splenic mRNA Expression and Transfection Efficiency	ACS Applied Materials & Interfaces (ACS Publications)	2026-07-16	US	Nanotechnology
S3-07	Sustainable Biogenic Iron Oxide Nanoparticles Demonstrate Potential for Removing Emerging Contaminants, Including PFAS, from Water Ecosystems	ACS Publications	2026-07-17	US	Nanotechnology
S3-08	ISO Publishes Standards for Nanoporous Silica Microparticles; OECD Releases Nanomaterial Dustiness and Dissolution Test Guidelines, Accelerating Regulatory Standardization	Bergeson & Campbell, P.C.	2026-07-16	US	Nanotechnology
S3-09	Stony Brook University and SWFT Labs Expand Partnership to Industrialize Sustainable Cellulose Nanomaterials as Plastic Alternatives	SBU News (Stony Brook University)	2026-07-23	US	Nanotechnology
S3-10	Nanocomposites Drive Innovation Across Industries: A Comprehensive Review on Material Classification, Synthesis, and Applications	Bharatiya Vaigyanik evam Audyogik Anusandhan Patrika (BVAAP)	2026-07-22	India	Nanotechnology
S3-11	Carbon Dots Emerge as Promising Nanoagents Against COVID-19, Showcasing Potential for Diagnostics and Therapeutics	MDPI	2026-07-22	Switzerland	Nanotechnology

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S3-12	IMEC, TSMC, Intel, and Samsung Pursue Atomically-Thin 2D Transistors to Sustain Moore's Law Beyond Silicon in 2026	Internet Pros	2026-07-19	US	Nanotechnology
S3-13	mRNA-LNP Technology Proven Effective in COVID-19 Vaccines, Bolstering Drug Delivery Customization Capabilities	Inside Therapeutics	2026-07-18	US	Nanotechnology
S3-14	GMG and Alstom Ink Exclusive MOU to Co-Develop Graphene Products for Rail Industry, Revolutionizing HVAC Systems	Graphene Manufacturing Group Ltd (Press Release)	2026-07-21	Australia	Nanotechnology
S3-15	mRNA Vaccine Patches Demonstrate Enhanced Stability with Polymer Matrix Drying, Paving Way for Cold Chain-Free Distribution	Managed Healthcare Executive	2026-07-16	US	Nanotechnology
S3-16	Stimuli-Responsive Biomimetic Nanomedicines Target Ischemic Stroke, Enhancing Therapeutic Efficacy via ROS Response	International Journal of Nanomedicine (IJN)	2026-07-21	International	Nanotechnology
S3-17	Manganese-Doped Carbon Nanodots Show Promise as Next-Generation Dual-Modal MRI and Fluorescence Imaging Agents	ACS Nano (ACS Publications)	2026-07-20	US	Nanotechnology
S3-18	Nanotechnology Advances Early Diagnosis and Targeted Therapy for Ovarian Cancer, Significantly Improving Patient Quality of Life	MDPI	2026-07-19	Switzerland	Nanotechnology
S3-19	Nanopore-Mediated Assembly Enables Precise and Continuous Synthesis of mRNA-Encapsulated Lipid Nanoparticles, Accelerating COVID-19 Vaccine Development	ACS Nano (ACS Publications)	2026-07-17	US	Nanotechnology
S3-20	Lithography-Free Electrical Contact Method Established for 2D Materials and Van der Waals Heterostructures	MDPI	2026-07-23	Switzerland	Nanotechnology
S3-21	Kavli Prize Honors Twistronics Pioneers for Reshaping Quantum Materials Science	NTU Singapore	2026-07-23	Singapore	Nanotechnology
S3-22	Graphene Companies Secure US Patents and \$815 Million Infrastructure Wins, Elevating Strategic Material Value	GlobeNewswire	2026-07-17	US	Nanotechnology
S3-23	ISO Cleanroom Classification Guide Explains Stringent ISO Class 1 Requirements for Nanotechnology Research	RaxPanel	2026-07-16	US	Nanotechnology
S3-24	HydroGraph Advocates for Graphene as a Strategic U.S. Material, Plans Domestic Production Facility	PRISM MarketView	2026-07-23	US	Nanotechnology
S3-25	Fudan University Unveils Room-Temperature 2D Single-Electron Quantum Flash Memory, Heralding New Era for Computing	China Daily	2026-07-24	China	Nanotechnology

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S3-26	Ohio State University Researchers Explore Natural Molecule for Cellular Energy Release, Paving Way for Nanomaterial Therapeutics	Ohio State News	2026-07-23	US	Nanotechnology
S3-27	Plasma Functionalization Enables Precise Surface Modification of 2D Materials like MXenes, h-BN, and TMDs for High-Performance Materials	ACS Material	2026-07-18	US	Nanotechnology
S3-28	Zirconium-Based MOF Sponge Composites Demonstrate High Efficiency in Removing PFAS from Aqueous Systems, Advancing Practical Water Treatment	ACS Publications	2026-07-16	US	Nanotechnology
S3-29	Novel Cobalt Aluminum Nanolaminate Alloy Achieves 10x Strength of Structural Steel While Retaining Flexibility	SciTechDaily	2026-07-20	US	Nanotechnology
S3-30	ProChimia Surfaces Pioneers Antiviral Nanomaterials to Counter Arboviral Threats	ProChimia Surfaces (News)	2026-07-21	Poland	Nanotechnology
S3-31	Iran Advocates for Unified Nanotech Standards, Proposing Regional Cooperation and ISO Integration	Tehran Times	2026-07-18	イラン	Nanotechnology
S3-32	Porous Framework Materials like MOFs and COFs Contribute to Removing Emerging Contaminants, Including PFAS, from Water	The Royal Society of Chemistry	2026-07-21	UK	Nanotechnology
S3-33	CAD Blueprint-Guided Diffusion Achieves Precision Programming of Protein Shapes for Advanced Nanostructure Design	bioRxiv	2026-07-23	US	Nanotechnology
S3-34	HydroGraph Inc. to Establish First Large-Scale U.S. Graphene Production Facility in Texas	HydroGraph Clean Power Inc.	2026-07-16	US	Nanotechnology
S3-35	QD-OLED Quantum Dot Materials Market Enters Growth Phase with Samsung Display Shipping Over 5 Million Panels	SMR (Market Research Report)	Date unknown	International	Nanotechnology
S3-36	Nanoscience Instruments to Showcase Advanced Nanomaterial Manufacturing and Characterization Solutions at ACS Fall 2026	Nanoscience Instruments	2026-07-23	US	Nanotechnology
S4-01	Dow Swings to \$802M Q2 Profit, Exceeding Expectations on Surging Polyethylene Prices and Cost Program	Dow Company (PR Newswire, Moomoo, BNN Bloomberg)	2026-07-23	US	Adhesives & Encapsulants
S4-02	Durante Adesivi Bolsters European Market Position with Advatac Acquisition, Expanding UK Woodworking Adhesives Production	SpecialChem	2026-07-17	Italy	Adhesives & Encapsulants
S4-03	Dow Invests \$100M to Globally Expand Specialty Silicone Production in US, China, and Japan	K Trade Fair	2026-07-19	US	Adhesives & Encapsulants

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S4-04	Henkel Unveils Next-Gen Thermal Gap Filler TGF 6500LVO with 6.5 W/m·K Conductivity for EV and ADAS Electronics	EuropaWire (PRESS RELEASE)	2026-07-22	Germany	Adhesives & Encapsulants
S4-05	Transpire Insight Forecasts \$13.4B Metal Bonding Adhesives Market by 2035; Henkel Accelerates EV Battery Design with AI-Powered Loctite Solve	Transpire Insight	2026-07-23	US	Adhesives & Encapsulants
S4-06	3M Dominates Epoxy Structural Adhesive Patents; Multi-Material Bonding for Automotive, Aerospace Lightweighting Remains Key Opportunity	Patsnap	2026-07-22	US	Adhesives & Encapsulants
S4-07	Wafer-Level Packaging: Scaling to \$28 Billion by 2035 Amidst Miniaturization Demands	()	2026-07-16	Unknown	Adhesives & Encapsulants
S4-08	APPLIED Adhesives Acquires Industrial Sales and Distribution, Expanding Silicone Solutions and East Coast Presence	Specialty Adhesives and Sealants (AdhesivesMag.com)	2026-07-19	US	Adhesives & Encapsulants
S4-09	Kansai Nerolac Strengthens Indian Adhesives Market Presence with Strategic Partnership Between Nerofix and Italy's Durante Adesivi	Indian Chemical News	2026-07-17	India	Adhesives & Encapsulants
S4-10	Acrylic Resins Dominate Pressure Sensitive Adhesives Market, Driving Eco-Friendly Products; Dow and Henkel Expand Emissions Reduction Partnership	Credence Research	2026-07-18	US	Adhesives & Encapsulants
S4-11	Sheen Technology Publishes Guide for 'Punchable Silicone-Free Thermal Conductive Material' for EV & AI Hardware Manufacturing	Sheen Technology	2026-07-23	Unknown	Adhesives & Encapsulants
S4-12	CuspAI Launches 'AI Materials Foundry' with Resonac and 45+ Partners to Accelerate Materials Discovery in Semiconductors, Energy, and Climate Change	Morningstar (Business Wire)	2026-07-20	UK	Adhesives & Encapsulants
S4-13	H.B. Fuller Acquires Advanced Medical Solutions for £660M, Bolstering Medical Adhesives Technology and Global Footprint	Perivan	2026-07-20	US	Adhesives & Encapsulants
S4-14	Lenovo Legion Y70 2026 Gaming Phone Boosts Cooling with 12 W/mK Liquid Metal and High-Conductivity Gel	Cashkr	2026-07-20	China	Adhesives & Encapsulants
S4-15	AtlasPCB Releases BGA Underfill Selection Guide Comparing Capillary Flow and Reworkable Formulations for Automotive, Aerospace	AtlasPCB	2026-07-21	Unknown	Adhesives & Encapsulants
S4-16	Intel Seeks Senior Module Test Engineer in Kulim, Malaysia to Advance CUF Module Improvement and New Material Application for Advanced Packaging	Jooble	2026-07-20	US	Adhesives & Encapsulants

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S4-17	Silicone Foam for Lithium Battery Packs Market to Grow Through 2035, Driven by Thermal Runaway Regulations; EV Batteries Lead End-Use	IndexBox	2026-07-22	Unknown	Adhesives & Encapsulants
S4-18	SK Hynix to Launch Advanced Packaging Plant in Indiana, USA by H2 2028 to Meet Surging HBM3 Demand	BigGo Finance	2026-07-22	South Korea	Adhesives & Encapsulants
S4-19	GM Mandates Specialized Adhesives for Corvette C8 Repairs, Signaling Industry Shift in Advanced Material Maintenance	(—)	2026-07-22	US	Adhesives & Encapsulants
S4-20	Chiplet Underfill Dispensing Market to Grow Through 2036 Driven by HBM and C2W Hybrid Bonding Void Reduction Needs	Fact.MR	2026-07-22	US	Adhesives & Encapsulants

Editor's Note

Navigating the Materials Revolution: Strategic Imperatives for Western Leadership

The materials and chemistry sector is at an inflection point, driven by the convergence of AI-accelerated discovery, stringent sustainability mandates, and the relentless pursuit of miniaturization. Innovations across functional materials, polymers, nanotechnology, and adhesives are not siloed but deeply interconnected, creating a dynamic landscape where breakthroughs in one area rapidly enable advancements in others. Western manufacturers, investors, and executives must recognize this integrated ecosystem to formulate effective strategies and capitalize on emerging opportunities.

The dual pressures of regulatory shifts, particularly the global phase-out of PFAS, and the imperative for supply chain resilience, exemplified by the push for rare-earth-free motors and domestic graphene production, are reshaping the competitive landscape. This necessitates a proactive approach to material sourcing, R&D; investment in sustainable alternatives, and the development of advanced manufacturing capabilities. Western players have a critical window to lead in these areas by leveraging their strong research foundations and fostering agile industrial ecosystems.

To secure long-term competitive advantage, Western stakeholders must prioritize cross-sector collaboration, investing in AI-driven platforms that shorten development cycles and enable rapid material qualification. Strategic partnerships between OEMs, material suppliers, and equipment makers are essential to translate laboratory breakthroughs into commercial products at scale. By embracing these integrated strategies, Western industry can not only meet the demands of a rapidly evolving market but also establish new benchmarks for innovation, sustainability, and technological leadership.

- ◆ How can Western manufacturers best leverage AI-driven materials discovery platforms to shorten product development cycles by 50% within 3 years?
- ◆ What specific investments are required to establish resilient, circular supply chains for critical materials, reducing reliance on geopolitical hotspots by 2030?
- ◆ How can cross-industry collaborations accelerate the commercialization of self-healing and adaptive materials to extend product lifespans and reduce waste by 25%?

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