



INSPIRE REPORT

The Next Era of Chemicals Innovation



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Executive Summary

The chemicals industry is at an inflection point. After sharp revenue declines in 2023 across the industry, 2024 and 2025 brought only marginal stabilization. Companies have responded with restructuring and cost discipline, yet ongoing geopolitical tensions, regulatory uncertainties, weakened demand, and price pressures from overcapacity continue to reshape the global landscape. Combined with the last cycle's overextension into sustainability efforts, often decoupled from tangible business outcomes, innovation teams now face growing pressure to deliver measurable results.

This 2026 update highlights how leading companies are recalibrating strategies with pragmatic, fundamentals-first innovation agendas: sharpening focus on core materials innovation, right-sizing timelines for defossilization and decarbonization, and holistically evaluating innovation opportunities across the technology ecosystem. Lux's client priorities define five strategic pillars that guide chemicals innovation leaders from defensive measures to proactive, forward-looking innovation and shape the next phase of the industry. A refreshed technology lens underscores the continued importance of the "future of carbon" ecosystem and the resurgence of emerging platform materials as a primary catalyst for innovation progress. Drawing on extensive engagement with innovation leaders globally, this report distills key insights for how the chemicals industry can achieve innovation success.

THIS REPORT ADDRESSES SEVERAL PIVOTAL QUESTIONS, INCLUDING:

- 1 How have the chemicals industry's most critical innovation priorities shifted?
- 2 Where are the near-term and next-horizon technology opportunities?
- 3 How are chemicals companies assessing innovation beyond technological developments?

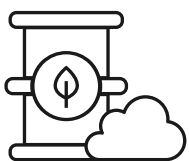


Lux Client Priorities

Lux Research's Chemicals Research and Advisory Service is designed for innovation leaders from **basic chemicals, diversified chemicals, and specialty chemicals companies**. Following the significant 11% revenue decline in 2023 and only modest improvement in 2024, the chemicals industry entered 2025 expecting a gradual recovery. Instead, it faced a more prolonged period of volatility, as weaker economic growth, shifting trade dynamics, geopolitical tensions, and persistent overcapacity continued to weigh on demand, pricing, and investment confidence. While many companies have responded through restructuring, operational streamlining, and cost discipline, these measures alone will not define the next phase of competitive advantage. At the same time, the industry is contending with the fallout from sustainability efforts that, in many cases, did not translate into clear business value at the pace

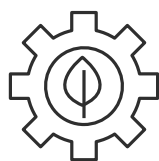
expected. This environment has pushed the chemicals industry to an inflection point, where companies with targeted, forward-looking innovation agendas will define the next phase of growth, while those that maintain a defensive stance will fall behind. Lux's client priorities for chemicals innovation leaders outline five strategic pillars that capture how leading companies are redefining innovation strategies to strengthen their position and emerge as leaders in the next era of chemicals innovation.

In this update, the following sections outline Lux's methodology for evaluating shifts across the five Lux client priorities for chemicals innovation leaders introduced in 2024, highlight differences in focus by organization type and region, and **detail how innovation executives across the industry are holistically assessing key technologies within each priority.**



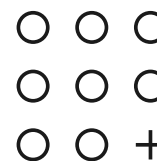
Defossilization of Raw Materials

Transform existing value chains through the integration of new sources of carbon to continuously meet product demand.



Decarbonization of Operations

Propel operations toward zero-emissions and zero-waste with innovative technologies and processes.



Future Materials

Accelerate the design, development, and deployment of future materials to enable new technologies and applications.



Uncovering New Market Opportunities

Discover and capitalize on the unmet materials needs of technologies and solutions on the rise.



Harmless Chemicals

Design products minimizing health and environmental impacts while aligning to human-centric needs.

Methodology & Analysis

To gain a consistent, updated understanding of strategic innovation priorities of the chemicals industry, Lux employed a two-step process to capture shifts across the Lux client priorities for chemicals innovation leaders and identify new technology topics from a range of public and proprietary data.

Leveraging Natural Language Processing (NLP) to Synthesize Distinct Topics and Themes

Lux conducted a comprehensive analysis of 80 annual reports from the world's largest chemicals companies and complemented this public information with Lux's proprietary, anonymized, and aggregated data, including nearly 6,500 questions asked and over 1,800 innovation initiatives shared by innovation leaders across the globe. Using advanced NLP techniques, Lux uncovered recurring themes, patterns, and emerging areas of focus, specifically in the context of technology, innovation, and R&D. This method provided a data-driven foundation for understanding where attention is shifting across the Lux client priorities and ensured the findings were grounded in both industry trends and reflective of real-world innovation initiatives.

Mapping distinct topics and themes to Lux client priorities and uncovering new trends and technologies

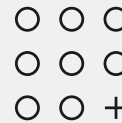
Using the topics and themes generated from the advanced NLP analysis, Lux mapped each to one of the five existing Lux client priorities. In this update, the assessment found that there were no significant topics or themes warranting a change in priorities or the introduction of a new priority. To vet and formalize the findings, Lux gathered feedback from nearly 40 innovation leaders to extract executive-level interpretations of the themes and leverage their industry expertise to ensure these five Lux client priorities continued to be aligned with organizational business needs and strategic priorities. These interviews provided a critical, industry-practitioner perspective — assessing the relevance, importance, and prevalence from the viewpoint of those at the forefront of innovation.



59% (18%↓)
Defossilization
of Raw Materials



75% (18%↓)
Decarbonization
of Operations



73% (33%↑)
Future Materials



52% (1%↓)
Uncovering New
Market Opportunities



66% (8%↓)
Harmless Chemicals

Figure 1. 59% and 75% of companies analyzed identified Defossilization of Raw Materials and Decarbonization of Operations as an innovation priority, respectively, exhibiting the sharpest drop from 2024 and reflecting both technology maturation and shifting focus from the chemicals industry. 73% of companies analyzed identified Future Materials as a key innovation priority, the largest jump from 2024, as core materials sciences return as an innovation driver for the chemicals industry.



Subindustry

The analysis identified clear shifts in strategic innovation priorities by subindustry, particularly among diversified chemicals and specialty chemicals companies, underscoring the more agile, product-focused approaches compared to the capital-intensive, asset-heavy portfolios of basic chemicals companies (Figure 2). This update highlights how companies are refining their innovation strategies to adapt to the current macroeconomic environment.

Defossilization of Raw Materials and **Decarbonization of Operations** remained the top two priorities for basic chemicals and diversified chemicals companies, continuing to account for most of the innovation-focused initiatives despite a decline in focus from the previous year. **Future Materials** stands out as the priority that increased across all subindustries, reflecting a sharpened focus on materials-led innovation. The increase was modest among basic chemicals and diversified chemicals companies, but more pronounced among specialty chemicals companies. **Uncovering New Market Opportunities** remains the most prominent priority among specialty chemicals companies, complementing the renewed focus on Future Materials to respond to evolving customer needs. Lastly, **Harmless Chemicals** largely held its position with the least amount of change across all subindustries.

CHEMICALS LUX CLIENT PRIORITIES BY SUBINDUSTRY

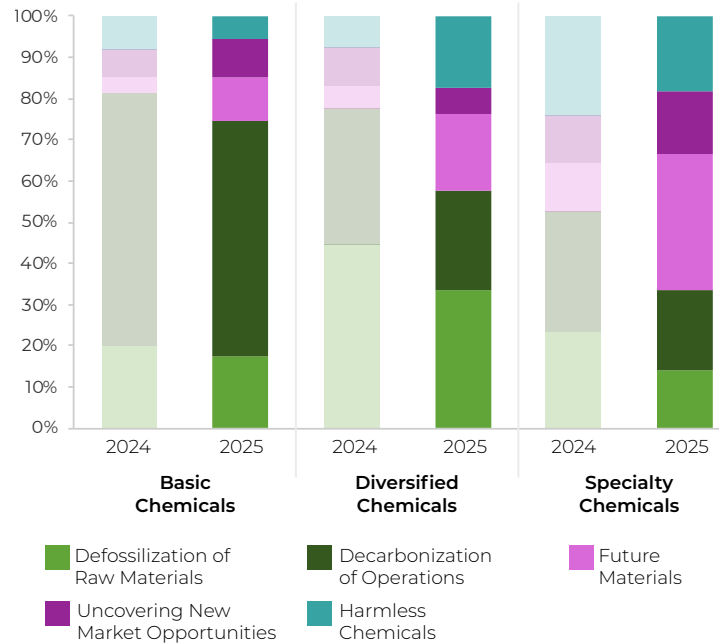


Figure 2. The relative percentage of the Lux client priorities identified by companies within each subindustry in 2024 (shaded) and 2025 (solid).

Region

At the regional level, variations in strategic innovation priorities have become more pronounced as market conditions continue to diverge across geographies. These shifts highlight the growing region-specific innovation needs and importance of correspondingly differentiated strategies, particularly for companies with global footprints.

Geopolitical tensions and regulatory uncertainties are paralyzing innovation functions and have become most notable in the U.S., where changes in innovation priorities, especially **Defossilization of Raw Materials** and **Decarbonization of Operations**, remained largely stagnant. **Future Materials** increased across all regions and emerged as the top priority in APAC, particularly in Japan and South Korea, where companies are reinforcing their positions as global leaders in materials science innovation. Differences in regional market outlooks have also led to a stronger focus on **Uncovering New Market Opportunities** in APAC, while priorities in the Americas and EMEA have remained consistent, as the latter prioritizes innovation and R&D efforts in existing market segments rather than increasing pursuit for new ones. **Harmless Chemicals**, meanwhile, remained constant in APAC and EMEA, where the regulatory outlook has been more predictable, while companies in the **Americas** pulled back from the heightened focus seen previously in response to litigation and public scrutiny.

CHEMICALS LUX CLIENT PRIORITIES BY REGION

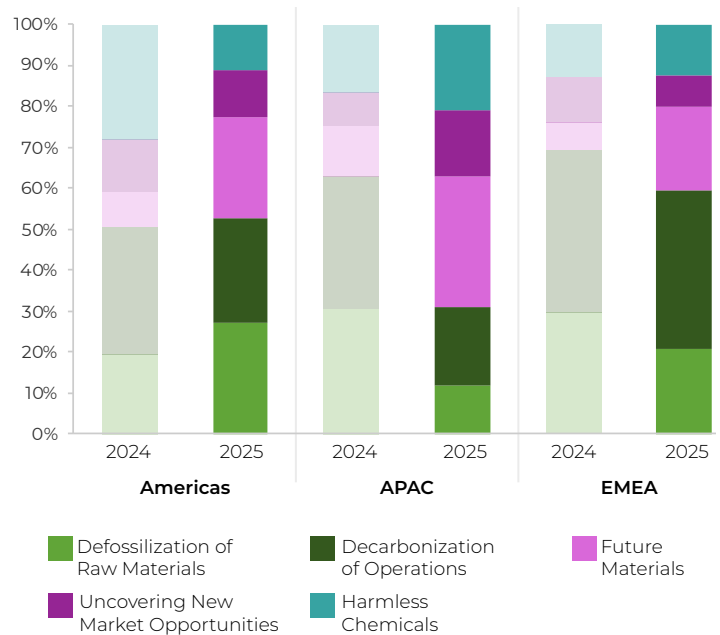


Figure 3. The relative percentage of Lux client priorities identified by companies based on the geographic region of their headquarters in 2024 (shaded) and 2025 (solid).



Technology Topic Analysis

A bottom-up analysis identified 76 technologies of strategic interest to chemicals innovation leaders; Lux highlights the top 25 below. Despite market headwinds, “future of carbon” technologies, including **Advanced Plastic Recycling, Biobased Chemicals, and CO₂ Utilization**, continue to top the list for innovation teams. Novel and advanced materials hold prominent positions in the top 25, reflecting the shifting innovation priorities for the industry toward core materials innovation. Topics include those that Lux introduced to its coverage in 2024, with **Advanced Coatings** and **Advanced Composites** rounding out the top five. Strategic interest continues to vary by subindustry,

with basic chemicals companies focusing on process innovations such as **Advanced Membranes, Low-Carbon Heat, and Point-Source Carbon Capture**, while specialty chemicals have the most pronounced diversity, driven by product innovation in response to the evolving demands of its customers.

To meet the innovation needs of the industry, Lux’s coverage is evolving by introducing new coverage on topics, including **2D Materials, Photonic Materials, Porous Framework Materials, Novel Electronic Materials, and Structural Performance Materials**.

TECHNOLOGY TOPIC	BASIC CHEMICALS	DIVERSIFIED CHEMICALS	SPECIALTY CHEMICALS
Advanced Plastic Recycling	High	High	High
Biobased Chemicals	High	High	High
CO ₂ Utilization	High	High	High
Advanced Coatings	High	High	High
Advanced Composites	High	High	High
Novel Electronic Materials	High	High	High
Photonic Materials	High	High	High
Thermal Management Materials	High	High	High
Consumer Packaging Materials	High	High	High
Synthetic Biology	High	High	High
Advanced Membranes	High	High	High
Industrial Wastewater Management	High	High	High
Structural Performance Materials	High	High	High
Materials Informatics	High	High	High
Bioplastics	High	High	High
Critical Minerals Extraction	High	High	High
Water Electrolysis	High	High	High
Porous Framework Materials	High	High	High
Low-Carbon Cement	High	High	High
Low-Carbon Heat	High	High	High
Industrial Robotics	High	High	High
Point-Source Carbon Capture	High	High	High
Sustainable Aviation Fuel	High	High	High
Low-Carbon Ammonia	High	High	High
Direct Air Capture	High	High	High

Figure 4. The figure above highlights the top 25 technology topics of interest identified by companies in the analysis. The heat map shows the relative level of interest for a technology within each subindustry. Note that, in this update, specific technologies within the hydrogen economy and carbon economy are individually presented, as Lux is seeing a divergence in interest toward specific technologies within the broader hydrogen economy and carbon economy worth analyzing individually.

Defossilization of Raw Materials

Transform existing value chains through the integration of new sources of carbon to continuously meet product demand.

Overview

While fossil-based raw materials will continue to be essential inputs for the chemicals industry for the foreseeable future, adopting alternative carbon sources and diversifying feedstocks remain strategic priorities for longer-term industry roadmaps. Although momentum has slowed and several high-profile setbacks have occurred in the past year, innovation interest remains strong, and the transition will continue to progress, albeit more slowly than anticipated, and with greater complexity. At the same time, low-cost geographies are reshaping raw materials trade flows and increasing geographic concentration risk among feedstock suppliers, reinforcing the need to supplement existing supply chains with more resilient sources of carbon as a hedge against volatility in an increasingly uncertain geopolitical environment.

Call to Action

Defossilization of raw materials remains crucial for enhancing overall supply chain resilience but must be approached holistically across the value chain.

Alternative carbon sources benefit from the foundation of several decades of R&D and learnings from previous commercialization efforts. Even so, a full transition at the scale required by the chemicals industry is unlikely to be economically feasible. Instead, chemicals innovation leaders should focus on using these emerging technologies to build more localized and resilient supply chains that complement, rather than replace, fossil-based raw materials. Some commercially proven technologies already enable the introduction of alternative carbon sources, offering near-term deployment opportunities. However, realizing commercial success in the near term depends on further developing downstream applications and stronger market readiness that can sustain commercial adoption.

CASE STUDY

In 2025, Zeon Corporation and the Yokohama Rubber Co. announced the construction of a bench-scale facility in Japan to demonstrate bioethanol-to-butadiene production, with Zeon converting the output into polybutadiene rubber for Yokohama to test and prototype tires. With butadiene, a key input for synthetic rubber in tires, mostly sourced as a steam cracker co-product, supply and pricing are exposed to cracker economics rather than end-market demand. The project showcases a complementary pathway to reduce dependence on volatile fossil-based inputs and highlights that defossilizing raw materials requires not only alternative production but also downstream performance and value chain compatibility.

Key Questions from Innovation Leaders to Unlock Success

- Under what policy and market conditions are required for **biobased, CO₂-derived, or recycled raw materials inputs** to see sustained cost-competitiveness with fossil-based inputs?
- How does variation in **pyrolysis oil** composition and contaminant profile affect upgrading requirements, downstream process compatibility, and the credibility of mass-balance claims?
- Which end-markets and customer segments have demonstrated a willingness to pay more for **biobased chemicals**, and what value propositions are most effective in justifying that premium?
- How do emerging **biomass pretreatment and fractionation** technologies compare on scalability, cost, and product yield, particularly in maximizing value from sugar, lignin, and fiber co-streams?
- Across **fixed-bed, fluidized-bed, entrained-flow, and plasma gasification** systems, which configurations have demonstrated the most reliable operation across varied feedstock inputs?
- Which customer segments, including marine transport, chemicals producers, and fuel blenders, show credible near-term demand for **low-carbon methanol**, and what purchasing criteria will determine adoption?
- How should **carbon capture** companies, **electrolyzer** manufacturers, and offtakers structure partnerships to create a commercially viable **CO₂ utilization** value chain?



Decarbonization of Operations

Propel operations toward zero-emissions and zero-waste with innovative technologies and processes.

Overview

Despite the softening of decarbonization headlines over the past year, chemicals companies remain firm on their net-zero and carbon-neutral commitments in the form of pledges or integration into their corporate strategy. Beyond reducing emissions, addressing waste management and wastewater discharge are also key pillars in the industry's decarbonization roadmap. Teams are deploying many near-term opportunities, such as energy-efficiency gains, fuel switching, and partial electrification, and are increasingly shifting implementation responsibility from innovation functions to operational teams. Yet, these near-term solutions are part of a broader phased approach, where transformational technologies must meet 2050 goals and require further technical development and investment before becoming economically viable and scalable. At the same time, decarbonization is becoming more closely tied to the long-term competitiveness and resilience of capital-intensive assets, particularly as companies face rising cost pressure, environmental compliance requirements, and growing uncertainty across regional markets.

Call to Action

Decarbonization should be viewed not only as a sustainability objective but also as a strategy to future-proof the capital-intensive assets that underpin the chemicals industry.

The right pathway will depend heavily on asset age, condition, remaining operating life, and retrofit potential: For newer or strategically critical assets, decarbonization investments can help reduce exposure to carbon costs, regulatory risk, energy price volatility, and shifting customer expectations while preserving long-term competitiveness. For older or less advantaged assets, the priority may be lower-cost operational improvements, targeted retrofits, or a more limited role within the broader production network rather than full-scale transformation. Chemicals innovation leaders should therefore approach decarbonization as a phased, asset-specific roadmap that balances immediate operational gains with disciplined long-term investment, focusing capital where it can most effectively protect asset value, strengthen resilience, and extend strategic relevance.

CASE STUDY

In 2025, Air Liquide made a final investment decision (FID) of EUR 500 million on a 200-MW water electrolysis plant at the Port of Rotterdam. The installation will have a 23,000-tonne/y hydrogen production capacity with offtake agreements from TotalEnergies' Belgium and Netherlands refineries. Notably, the Dutch government will subsidize 50% of the total planned investment. The FID highlights a blueprint for a subsidy-enabled, cross-border hydrogen model for industrial and chemicals decarbonization and the government's role in progressing decarbonization in a market marked by setbacks.

Key Questions from Innovation Leaders to Unlock Success

- What near-term operational decarbonization strategies are chemicals companies relying on to meet 2030 goals, and which **transformational technologies** are expected to be critical for **achieving 2050 ambitions**?
- How are chemicals companies determining which **assets to prioritize for decarbonization** based on retrofit feasibility, remaining asset life, and emissions intensity?
- How do emerging **low-carbon heat technologies** compare with fossil-based boilers on thermal efficiency, achievable temperature range, reliability, and delivered cost of heat across different chemical processes?
- Which **point-source carbon capture** technologies, including **solvents, sorbents, cryogenic, semipermeable membranes, and electroswing**, are best suited to the range of CO₂ stream concentrations, impurities, and operating conditions found across chemical production assets?
- How are partnerships forming across renewable power providers, hydrogen producers, storage and transport players, and industrial end-users to enable scale-up in the **low-carbon hydrogen** value chain?
- Which low-carbon hydrogen production pathways, such as **electrolysis, natural gas reforming with carbon capture, and methane pyrolysis**, have demonstrated stable performance, consistent hydrogen quality, and operational reliability in pilot- and demonstration-scale industrial projects?
- Which **industrial wastewater treatment** or water reuse technologies are being adopted to reduce both emissions and discharge intensity in chemicals operations?



Future Materials

Accelerate the discovery, design, development, and deployment of future materials to enable new technologies and applications.

Overview

Materials innovation impacts every aspect of industrial development and daily life. Whether driven by targeted performance needs or fortuitous discoveries, the design and development of future materials are key for enabling cutting-edge technologies and applications. As technology development cycles continue to shorten, the chemicals industry must push the boundaries of innovation to stay competitive. The ability to anticipate and respond to future performance demands will be crucial in seizing opportunities in emerging applications. Companies with a robust portfolio of future platform materials will be best positioned to capitalize on opportunities where incumbent materials have reached their performance limits.

Call to Action

Future materials development is at the heart of the chemicals industry's innovation engine and is now regaining sharper focus.

As recent sustainability-driven innovation efforts have largely fallen short of delivering clear business results, many companies are returning to core innovation fundamentals. At the same time, the current macroeconomic environment is putting additional pressure on innovation teams to deliver measurable results. Many breakthroughs in materials science, while technically transformative, have struggled commercially due to challenges in manufacturability and market readiness. Yet, the cost of missing the next game-changing material may be even greater. To improve the odds of success, chemicals innovation leaders must adopt a two-pronged strategy built around smart bets — accelerating materials discovery, design, and development at the front end — while actively scouting for market opportunities shaped by materials limitations, performance gaps, and evolving consumer needs on the back end.

CASE STUDY

In 2025, Periodic Labs, a developer of “AI scientists” and lab automation solutions, raised USD 300 million in one of the largest funding rounds in materials informatics history. Although the technical details of Periodic Labs’ capabilities remain undisclosed, it integrates AI with automated lab-generated experimental data for novel materials discovery. This funding round solidifies the resurgence of interest in materials informatics, as the materials industry aims to accelerate R&D. However, capabilities remain vastly overstated and largely speculative.

Key Questions from Innovation Leaders to Unlock Success

- Where are **advanced coatings** delivering measurable performance gains over incumbent materials in real-world operating environments, and which end-use applications are showing the clearest commercial pull?
- Which classes of **metamaterials** are demonstrating truly differentiated functionality, and how easily can they be integrated into existing product architectures, manufacturing processes, and supply chains without introducing unacceptable cost or complexity?
- What technical and manufacturing advancements are still required to transition **2D materials** from lab-scale validation to prototype testing and early commercial deployment?
- Which advances in resin systems, fiber architectures, and manufacturing methods are most critical to reducing the cost and complexity of **advanced composites** production?
- Which next-generation **structural performance materials** are moving beyond pilot production today, what manufacturing bottlenecks remain, and which early adopters are actively validating these materials in commercial applications?
- How mature is the value chain for **metal-organic frameworks**, from raw material supply and manufacturing capacity to application development and downstream adoption?
- How are chemicals companies incorporating **materials informatics** into R&D and product development workflows, where are they seeing measurable value, and what organizational or technical barriers are slowing broader adoption?



Uncovering New Market Opportunities

Discover and capitalize on the unmet materials needs of technologies and solutions on the rise.

Overview

The target markets of the chemicals industry are evolving, driven by technological advancements, new customer value chains, and changing performance expectations reshaping demand. To stay ahead, chemicals companies must proactively monitor shifting customer needs and market transitions, anticipate unmet demands for materials, and reposition their capabilities and solutions toward adjacent or new market opportunities. Staying ahead of these industrial shifts will be a key competitive differentiator as technological change accelerates.

Call to Action

As markets evolve, chemicals companies need to continuously scan emerging opportunities and discern between real growth prospects and speculative outlooks.

With the chemicals industry adjusting to recent market setbacks, growth in conventional sectors is likely to remain closely tied to global economic development. In response, many companies are looking toward new markets expected to outpace global GDP growth, including those that can be served with existing chemicals and materials as well as those that will require new materials platforms. Given the uncertainty surrounding many of these opportunities, chemicals innovation leaders need dynamic and agile product strategy roadmaps, informed by a clear understanding of the technological advances and signals to quickly enter new markets. Not every opportunity will prove viable, and success will be determined by the ability to pivot and scale when opportunities solidify.

CASE STUDY

In 2025, Sion Power installed a 75-MWh pilot line for 56-Ah Li-metal cells. While Li-metal's high energy density faced tradeoffs including cycle life, manufacturing capability, and safety, those challenges are gradually being resolved through materials innovations and scaled engineering design. Despite just being a pilot line, the development marks real progress toward EV adoption for Li-metal batteries and the acceleration of next-generation battery architectures that will unlock new opportunities for materials companies in a battery value chain currently dominated by Li-ion and its incumbents.

Key Questions from Innovation Leaders to Unlock Success

- Which emerging materials are enabling **next-generation thermal management** in data centers, and how are they addressing unmet needs in heat dissipation, reliability, and energy efficiency as cooling architectures evolve?
- Which energy storage applications are emerging as the best fit for **novel battery chemistries**, and what performance advantages are enabling adoption?
- How is the value chain for **battery recycling** maturing to ensure the recovery of critical battery materials in different regions?
- As **quantum technologies** advance at different rates across computing, communication, and sensing, where are the most immediate market opportunities emerging, and which applications are demonstrating real-world value today?
- What benchmarks must be achieved for **advanced sensors** to move from niche applications to widespread industrial application?
- How are converters and packaging manufacturers integrating **novel consumer packaging materials** into their supply chain and manufacturing plans?
- Which **barrier solutions** can meet food and beverage companies' packaging requirements for barrier performance, processability, and end-of-life recovery without compromising cost or scalability?
- Which policy and regulatory developments are creating the strongest new market opportunities in **wastewater treatment**, and how are they shaping demand for emerging treatment materials and technologies?



Harmless Chemicals

Design products minimizing health and environmental impacts while aligning to human-centric needs.

Overview

Hazardous substances are increasingly becoming business liabilities. This shift reflects not only rising consumer scrutiny amplified by social media but also expanding scientific and regulatory understanding of chemical fate, transport, persistence, and exposure. As new data clarify how certain substances accumulate, migrate, or interact with biological systems, chemicals once considered low risk are now recognized as potential hazards. Over the past decade, classes of chemicals such as PFASs and bisphenols have moved from industry staples to the center of litigation, restrictions, and phaseouts. The resulting economic exposure such as lawsuits, reformulation costs, and loss of market access is pushing companies to evaluate their portfolios not only on performance and cost but also on inherent safety and long-term regulatory resilience. Developing chemicals with minimal human and environmental impact is therefore essential, not just for compliance but also for maintaining brand reputation and staying competitive.

Call to Action

Developing harmless chemicals goes beyond compliance — it helps companies hedge long-term risks, preserve their social license to operate, and unlock near-term opportunities to offer differentiated products.

Regulatory affairs teams manage product portfolios to address legal bans and restrictions, but innovation leaders hold primary responsibility for advancing harmless chemicals. They must track emerging safer chemistries and anticipate phaseouts based on new scientific insights and evolving consumer sentiment. In today's social media environment, where viral moments can trigger product backlash — accurate or not — leaders must distinguish between short-lived sensationalism and durable consensus. Building a portfolio of harmless chemicals positions companies to capture near-term differentiation and adapt to long-term regulatory shifts while mitigating financial and reputational risk.

CASE STUDY

The EU proposed PFAS restrictions in 2025 as one of the most sweeping regulatory actions to date, effectively banning PFASs. A potential ban on the manufacture, sale, import, and use of polymeric PFAS products will have global implications, as these materials underpin the membrane industry. Although the phaseout will span a decade, it underscores the need for the chemicals industry to accelerate the development of alternative materials — not only to mitigate risk but also to prevent billions of dollars in global manufacturing capacity from becoming obsolete.

Key Questions from Innovation Leaders to Unlock Success

- How do **PFAS-free coatings** compare to incumbent fluorinated chemistries on performance?
- Which **biopesticides** and **alternative crop nutrition** inputs can deliver equivalent or superior efficacy to conventional products while reducing environmental impact?
- How are **materials informatics** tools being adapted to discover and design chemicals and materials to mitigate safety and health risks?
- How are chemicals companies incorporating **advanced membranes** into their processes to handle micropollutants in waste streams?
- What partnerships are being formed across the value chain to deliver turnkey **industrial wastewater management** solutions?
- Which end-use applications offer near-term market pull for **synthetic biology**, and how are innovators positioning the value proposition of their platforms?
- How are regional regulatory trends around **PFASs** and **microplastics** reshaping supply chains, and how are companies collaborating to mitigate risks?



Lux Recommends

The chemicals industry is approaching an inflection point as the convergence of geopolitical tensions, regulatory uncertainties, and market pressures is establishing a challenging environment for chemicals innovation leaders to navigate.

The shifting focus in Lux client priorities provides strategic pillars for forward-looking innovation teams to map out the next phase of growth and build long-term competitiveness.



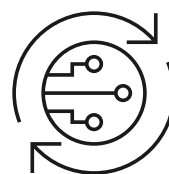
Fill out the front end of your innovation funnel.

Staying focused and committed to innovation management fundamentals is a growing challenge in today's environment, with companies directing resources away from long-term innovation initiatives toward short-term objectives. Conversations with dozens of CTOs and CIOs in 2025 have uncovered significant concerns about innovation funnels running dry during this period of defensive posturing, underscoring potential long-term consequences. While chemicals innovation leaders must meet near-term KPIs, they should also track emerging technologies and proactively build their innovation pipelines with high-impact breakthroughs rather than wait for external validation.



Leverage weak signals to spot early, subtle signs of change.

Chemicals companies cannot afford to innovate across their entire portfolio. Instead, they must prioritize the products where they can deliver concrete impacts and differentiation. At the heart of this forward-looking strategy is the ability to detect weak signals — early, often-overlooked events that foreshadow larger changes — enabling chemicals innovation leaders to anticipate disruption, methodically amplify them into actionable strategies, and build the agility to pivot as global conditions shift.



Assess innovations beyond technological momentum.

The likelihood of success for any innovation goes beyond the technology itself, requiring coordination, alignment, and maturation across product, technology, market organization, market readiness, and production. Monitoring developments across these five factors of innovation success provides a holistic assessment of innovation initiatives and enables chemicals innovation leaders to dial-in the timing and size of innovation bets. This practice is growing increasingly important for innovation functions to address the complexity of their company's ecosystem when technological advancements are not enough to drive commercial traction.





About Lux

Lux Research fuels innovators to not only imagine what's possible in the future but also operationalize innovation success in the near term. We deliver research and advisory services to inspire, illuminate, and ignite innovative thinking that reshapes and grows businesses. Using quality data derived from primary research, fact-based analysis, and opinions that challenge traditional thinking, our experts focus on finding truly disruptive innovations that are also realistic and make good business sense.

The “Lux Take” is trusted by innovation leaders around the world, many of whom seek our advice directly before placing a bet on a startup or partner — our clients rely on Lux insights to make decisions that generate fantastic business outcomes. We pride ourselves on taking a rigorous, scientific approach to avoid the hype and generate unique perspectives and insights that innovation leaders can't live without.

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