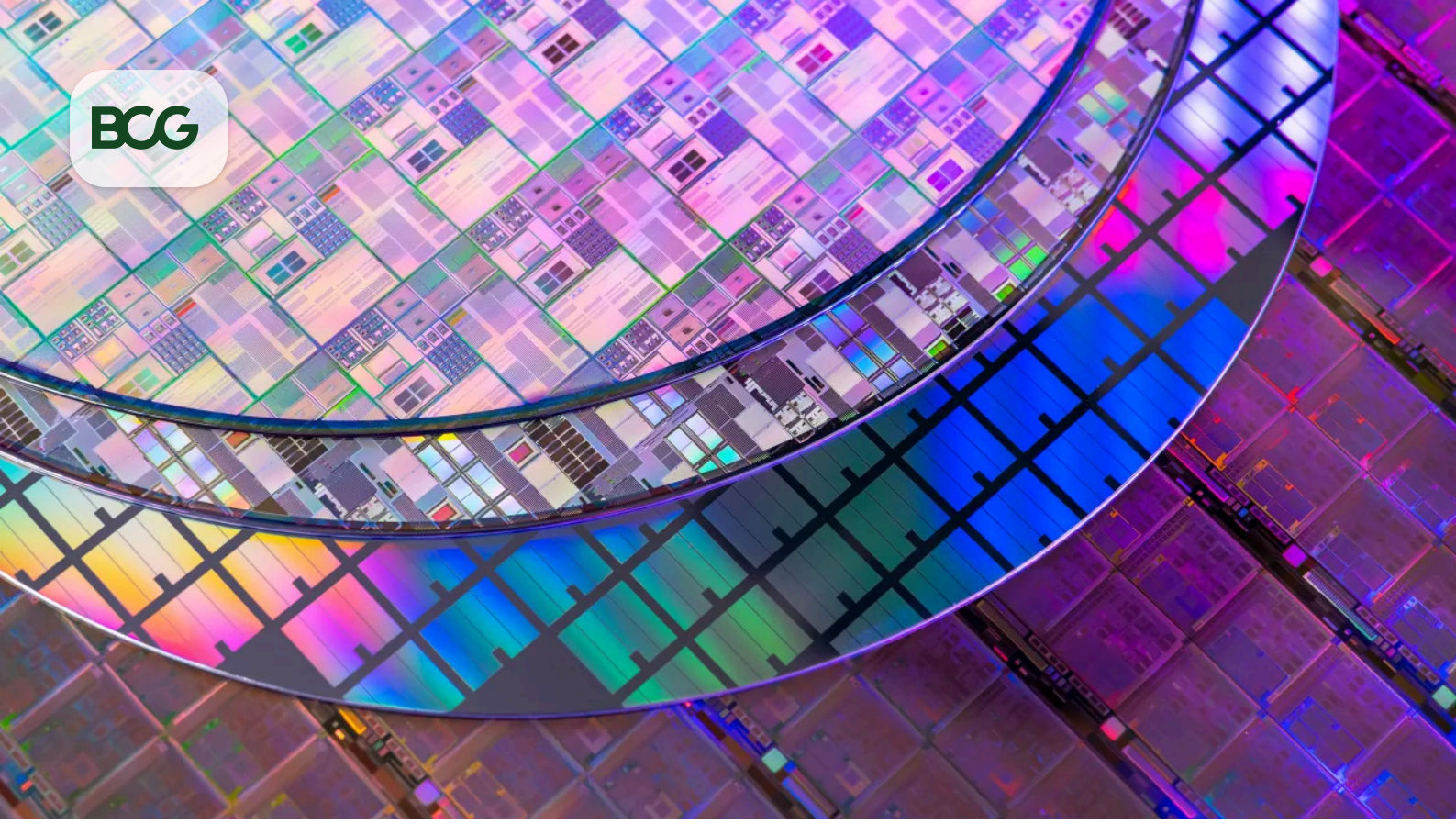

ENERGY

Opportunities for Chemical Companies in the AI Infrastructure Boom

By Arun Rajamani, Hyeonmi Kim, Ramiro Palma, and Rachit Agarwal

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Given the current downcycle in the global chemicals industry, many companies are looking for new sources of growth and value. Our extensive research reveals that electronic chemicals and materials have emerged as a compelling focus area for chemicals, petrochemicals, and materials companies wishing to buy into an expanding and profitable market. In fact, several sectors in this

space are expected to see CAGRs of 5 to 10 percent to 2030, with EBITDA margins in excess of 20 percent.

This growth will be generated primarily by accelerating demand for AI, which is cascading beyond software and into its supporting infrastructure—including microchips, memory, and storage related to the growing need for computation. It will also be spurred by the need for more automation, which is leading to a revolution in robotics. Each of these business areas requires a great deal of specialized chemicals and materials, such as photoresist, wet chemicals, and thermally conductive adhesives, that are integral to the manufacturing and functioning of a wide range of electronic devices.

This is an enormous and complex domain. Investing successfully will require selecting, acquiring, and integrating with companies in the appropriate market niche—one that allows the buyer to leverage its own existing capabilities, co-develop with customers, and scale the business through disciplined investment and, potentially, further M&A.

In this article, we examine how chemical companies can capture value from the AI and semiconductor boom, and we identify the most attractive segments and the capabilities needed to compete successfully.

The AI Boom Is Creating New Opportunities

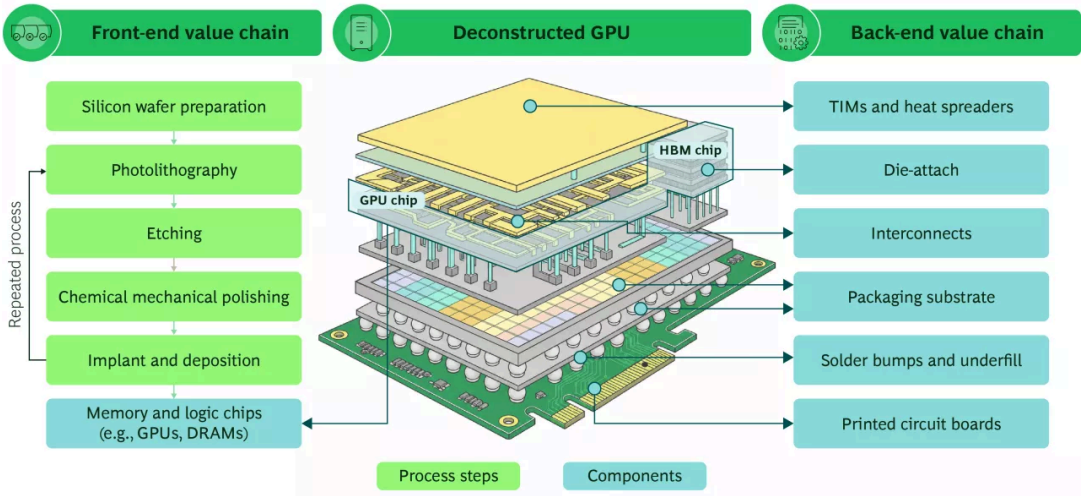
AI adoption has accelerated rapidly over the past decade, building on machine-learning and recommendation systems and, more recently, expanding through generative AI into copilots, multimodal systems, and increasingly agentic workflows. Companies are now deploying these capabilities across everyday tasks and redesigning critical workflows around them. Worldwide spending on AI is expected to exceed $2.5 trillion in 2026, according to Gartner, with the CEOs we surveyed saying corporate AI investment will double as a share of revenues, from 0.8% in 2025 to about 1.7% in 2026.

The most direct opportunity is in advanced semiconductors, particularly AI accelerators, high-bandwidth memory, and advanced packaging. Systems built around leading-edge GPUs can cost tens or hundreds of thousands of dollars and combine advanced logic, memory, packaging, substrates, interconnects, and thermal-management materials. Manufacturing these components requires tightly sequenced processes in which specialized chemicals and materials directly affect yield, reliability, throughput, and ultimately performance and cost for players along the manufacturing value chain. (See Exhibit 1.) Demand for electronic chemicals and materials in this market is growing rapidly, in part due to a shift to advanced node technology in microchips,

which requires more materials, and to expanding electronics manufacturing in Asia, the US, and the EU.

EXHIBIT 1

The Semiconductor Value Chain, from Wafer Fabrication to Advanced Packaging and Board Assembly



Source: BCG analysis.
Note: HBM = stacked high bandwidth memory; GPU = graphics processing unit; DRAM = dynamic random-access memory; TIMs = thermal interface materials.

The opportunity also extends well beyond microchips. For example, data centers' evolving operating conditions generate greater demand for thermal management solutions as computation density increases, as well as for auxiliary services around utilities and power generation. In addition, embodied AI and robotics rely on specialized polymers, lightweight structures, sensors, and other advanced materials, including engineered plastics.

The electronic chemicals and materials segment is therefore emerging as a compelling focus area for growth, backed not only by structural expansion but by barriers to entry such as high R&D, long qualification cycles, and tool and process integration between manufacturers and suppliers that encourage "sticky" relationships and co-development. The total addressable market for electronic chemicals and materials across the semiconductor supply chain is over $75 billion today, by our estimates, with AI and advanced computing representing important incremental growth drivers. And the returns are attractive, with electronic chemicals and materials having delivered a 15% median annual TSR from 2020 through 2024—compared to 7% across the global chemicals industry and around 10% across all industries.

Mapping the Opportunity for Chemicals Companies

Sorting out the best investment prospects in the universe of electronic chemicals and materials relevant to AI, robotics, and semiconductors isn't easy. No single segment can be considered the best opportunity, as suitability for either M&A or organic expansion will depend on each chemical player's starting position. In addition, entry feasibility and competitive advantages will vary by technical infrastructure, core capabilities, and customer and supplier access.

To open a window into this complex arena, we have organized it into 5 primary segments and 26 product groups. (See Exhibit 2.) Companies should look first for a segment that matches their strongest competitive edge, such as via platform adjacency or a shared technology backbone or market access.

EXHIBIT 2

The Electronic Chemicals and Materials Universe Relevant to AI, Semiconductors, and Robotics

Segments	Compute and semiconductor hardware	Packaging, PCB, and assembly	Thermal and power infrastructure	Optical and structural materials	Facility and sustainability chemicals
Market size ($B) YE 2025 | 2030	$40 | $70	$30 | $50	$6 | $10	$3 | $5	<$2 | <$3
EBITDA margin	~20%	~15%	~25%	~15%	~10%
Product groups: Chemicals/ materials	Substrate feedstock		Thermal interface materials	Display materials	Wastewater and exhaust treatment
	Wafer substrates	Packaging substrates	Heat spreaders/ exchangers	Structural substrates and composites	Cleanroom and EHS consumables
	Lithography and ancillaries	Die-attach/ interconnect	Dielectric coolants	Adhesives and sealants	Fire suppression and refrigerants
	Wet processing chemicals	Encapsulants	Loop additives and inhibitors	Coatings and lubricants	
	Atmospheric and specialty gases	PCB substrate materials	Power conversion materials		
	Chemical mechanical polishing	Thick film material			
		PCB resists			
		PCB plating chemicals			
		PCB etchants			

Source: BCG analysis.
Note: PCB = printed circuit board; EHS = environmental health and safety.

AI-linked demand is primarily concentrated in the semiconductor value chain, especially in the front end and in advanced packaging. Other areas can be attractive as well; however, they are

often less tied to AI growth because they have broader end-market exposure or less AI-driven innovation. (See “Example Attractive Plays.”)

– Example Attractive Plays

One of the most promising areas is lithography and its ancillaries, which had revenues of more than $5 billion in 2025, a 10% CAGR projected to 2030, and around 20% EBITDA, according to our analysis. Lithography is a yield-critical patterning step in semiconductor manufacturing, creating attractive opportunities in several specialized chemical niches.

- **Sub-components of resists** (light-sensitive materials used to form a patterned coating on a surface), such as photoacid generators, stabilizers, specialty monomers, and additives, serve as supportive building blocks across multiple resist platforms. Investing in this sub-sector would therefore provide diversified exposure to major resist formulators rather than reliance on the maker of a single finished product. Differentiation is driven by ultra-high purity and molecular performance, sustaining attractive margins for suppliers.
- **Lithography clean and strip solutions,** such as strippers, removers, and post-lithography cleans, face increasingly demanding requirements around residue removal, surface preparation, contamination, and defect control as leading-edge patterning becomes more complex. Compared with leading resist products, qualification cycles are often shorter and the supplier landscape more fragmented, creating more entry opportunities for emerging players.

Separately, thermal interface materials represent another attractive materials opportunity, with 2025 revenues of around $2 billion, a 10% CAGR to 2030, and greater than 20% EBITDA.

Entegris Demonstrates How Players Build and Scale an Electronic Chemicals and Materials Platform

Entegris has evolved from a diversified supplier of contamination-control and materials-handling products into a broad semiconductor materials, process-solutions, and contamination-control platform. The company has an enterprise value of around $20 billion (more than double its 2019 value) and EBITDA consistently exceeding 25%. Its growth can be described as following a three-step playbook:

Step 1. Establish a foothold. The company began in purity and contamination control and created a track record to establish its purity expertise and gain access to fabrication plants.

Step 2. Expand into adjacencies. Entegris expanded into adjacent materials and process-solutions categories that shared technology foundations and customer access.

Step 3. Scale and solidify. The company subsequently used acquisitions—including ATMI and CMC Materials—to broaden its position across specialty materials, CMP, and other semiconductor process categories, while later divesting selected businesses to sharpen its portfolio focus.

A Playbook for Growth

Capturing value in electronic chemicals and materials will require some very deliberate, disciplined choices, such as where to enter, how to differentiate, and whether scaling will be feasible.

Choose a niche.

To approach this opportunity successfully, businesses should focus on one or two attractive niches in a chosen area that are aligned with their existing strengths, rather than entering the area more broadly. These niches should be pockets of growth in which the business can build a credible competitive edge by, for example, leveraging its existing capabilities (such as purification,

formulation, analytics, or application support), regional manufacturing footprint, or access to customers or suppliers. The eventual choice should be very company-specific.

Acquire strategically.

Companies should be sure to use their M&A and partnerships in a tactical manner, prioritizing "bolt-on" acquisitions that add qualified products, talent, or customer access while remaining in the chosen focus area.

Integrate into the target niche.

With the acquisition in hand, companies should preserve and deepen the acquired qualification base. In semiconductor materials, qualification can be tied not only to the product formulation but also to the manufacturing process and site, raw-material set, packaging and delivery system, analytical controls, and change-management regime. Companies should therefore integrate selectively, maintain rigorous change control, and work with anchor customers to qualify and co-develop next-generation products.

Fortify the position.

Businesses should prepare for geopolitical and supply-chain volatility by using scenario planning to prepare for disruptions such as new tariffs, export controls, or localization requirements, all of which will be especially important in a volatile environment. They should also build resilient supply chains through qualified second sources for critical inputs and, where justified, dual-qualified regional manufacturing capacity. Because manufacturing-site changes can themselves require customer approval or requalification, regionalization should be incorporated deliberately into the qualification strategy.

In this complex domain, businesses must approach each investment thoughtfully and systematically, aligning the opportunities with their existing strengths and qualifications, to reap the potential benefits and uncover new growth.

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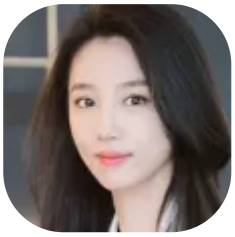

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