

THE ELECTRONIC MATERIALS REPORTER

SECOND QUARTER • AUGUST 2022



- This is the Q2 2022 issue of Prismark's **Electronic Materials Reporter (EMR)**. This issue reviews year-to-date market developments, highlights the fastest-growing electronic materials segments, and focuses on a review of several materials segments: semiconductor packaging, interconnect materials, battery materials, and board-level and systems-level assembly materials.
- Prismark has **revised upward its electronic materials estimate for 2022**, with declining prospects in conventional electronic materials more than offset by stronger growth in battery and PV materials. We now expect the materials market in total to grow 12.7% in 2022 over 2021. However, conventional materials (excluding battery and PV materials) are expected to decline at -2.1%, similar to Prismark's revised electronic systems forecast.
- **High-growth opportunities** remain available across various segments of the materials market. Some 20 distinct materials are expected to offer growth rates of at least 6% CAAGR from 2021 to 2026.
- The **semiconductor packaging** materials segment had two strong years in 2020-2021, but is now expected to return to more modest growth at 1.9% CAAGR from 2021 to 2026. The segment is held back by miniaturization and the adoption of materials-poor advanced package types.
- The **interconnect materials** segment had an extremely strong year in 2021, with 34% growth. This high baseline now reduces the growth outlook through 2026 to only 1.6%. Materials related to IC package substrate production offer the fastest growth prospects.
- The **battery materials** segment is by far the fastest-growing segment of the electronic materials market. Rapid adoption of electric vehicles is expected to drive battery materials growth at 21% CAAGR through 2026.
- **PCB and systems assembly materials** are expected to grow at 2.5% CAAGR, held back by the high 2021 baseline as well as the segment's dependence on a number of quasi-commoditized materials.

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FIRST QUARTER • MAY 2022



- This is the Q1 2022 issue of Prismark's **Electronic Materials Reporter (EMR)**. This issue is focused on the review and forecast of the electronic materials market, segmented by application space.
- The electronic materials market grew 33% in 2021 over 2020, reaching a value of \$217Bn. Growth was boosted by the battery materials and PV materials segments: excluding these segments, growth was 17.5%.
- Commodity price increases had a significant impact in 2021. Price increases for copper, tin, silver, gold, and cobalt contributed about 4% to overall electronic materials revenues. Other commodities such as silicon metal or lithium precursors contributed a similar amount. Currency exchange rate fluctuations similarly made a positive contribution to the materials market growth, estimated at about 2%.
- Except for display materials, all materials segments showed solid double-digit growth. Battery materials were the leader at 97% growth, followed by PV materials at 47%, and interconnect materials at 34% growth.
- For 2022, Prismark expects a much softer year with a moderate 3% growth across the traditional electronic materials segments, reflecting the slower electronics systems growth outlook. Including battery and PV materials, we forecast 12% growth for the total electronic materials market.
- The mid-term outlook for the electronic materials market stands at 7.6% CAAGR 2021 – 2026. Excluding the battery and PV materials segments, the forecast for the remaining traditional electronic materials segments would be 3.3% CAAGR, partly held back by the strong 2021 comparison baseline.
- Apart from large, fast-growing segments such as battery materials, smaller fast-growing niches exist in almost all segments. Other growth strategies for electronic materials suppliers include market share gains through innovation and focused commercial efforts, finding new applications for existing technologies, and consolidation or acquisitions to expand product portfolios.

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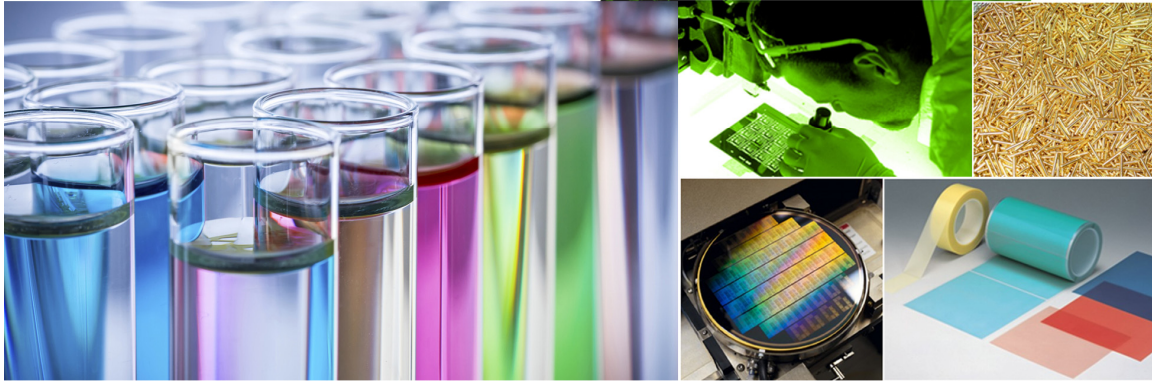
FOURTH QUARTER • FEBRUARY 2022



- This is the Q4 2021 issue of Prismark's **Electronic Materials Reporter (EMR)**. This issue provides initial estimates for full-year 2021 and an outlook for 2022, and focuses on a review of several materials segments: semiconductor wafer fabrication materials, display fabrication materials, photovoltaics materials, and materials used in the fabrication of other components.
 - Semiconductor **wafer fabrication materials** grew over 16% to \$32.9Bn in 2021. This materials growth was driven by well over 20% IC unit growth. Prismark's segment growth outlook stands at 6.6% CAAGR 2020-2025.
 - The **display materials** market grew by almost 4% in 2021, performing much better than in recent years. The 2020-2025 growth outlook stands at 1.3% CAAGR. As in recent years, the gradual transition to OLED technology remains the most significant trend.
 - **PV materials** grew an outstanding 47% in 2021, driven by a combination of solid volume growth and higher materials prices. The flip side of this extreme growth is an essentially flat outlook over the subsequent several years as pricing normalizes, for an entirely front-loaded 2020-2025 growth outlook of 8% CAAGR.
 - The "**Other components**" segment includes materials for passives, connectors, and data storage components. Driven by strong systems demand, this materials segment grew 19% in 2021, reaching \$13.7Bn. The five-year outlook is for just under 5% CAAGR.
- Prismark's preliminary estimate for full-year 2021 electronic materials market growth stands at more than 32% over 2020. Half of this growth was due to battery and PV materials. For 2022, our current estimate calls for almost 10% year-over-year electronic materials market growth in total, but only 1.6% excluding battery and PV materials.

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THIRD QUARTER • NOVEMBER 2021



- This issue of the *Electronic Materials Reporter* surveys the leading electronic materials suppliers.
- We profile the top 50 electronic materials suppliers by revenue during calendar year 2020. The electronic materials business of the largest supplier (Shin-Etsu) came close to \$5Bn by Prismark's definitions. In total, the top 50 suppliers generated some \$97Bn in electronic materials sales during the year.
- The battery materials segment stands out as a particularly fast-growing segment, and accordingly suppliers of related materials are increasingly to be found among the leading suppliers.
- Japanese-headquartered companies continue to dominate the list of leading electronic materials suppliers. However, their share has declined to 44% both by number and by revenue.
- The electronic materials market as a whole remains fragmented. The top 50 suppliers identified here represent some 60% of the total electronic materials market.
- In contrast, many individual market segments are highly concentrated. This applies especially to large segments with high customer concentration, where the need for access to financial and technology resources creates barriers to entry.
- The electronic materials forecast for 2021 has been revised upward to 25% growth over 2020. In contrast, the initial outlook for 2022 is for a slowdown to only 3% annual growth.



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