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Electron microscopy images can be interpreted in minutes by AI

An electron microscopy image can capture atoms arranged in a crystal lattice or defects threading through a semiconductor material, but turning that image into materials insight can take weeks of careful analysis. Now, an autonomous artificial intelligence platform developed at Cornell University in the USA can do that work in minutes.

Electron microscopy produces incredibly rich information, but the bottleneck is often turning those images into usable scientific understanding. The researchers have built an autonomous AI platform that helps bridge that gap and makes advanced materials analysis faster, more integrated and more reproducible.

The researchers demonstrated that EMSeek can process a microscopy image into a structured scientific output in just two to five minutes, roughly 50 times faster than conventional expert workflows. The system was tested across 20 different materials and five tasks typically performed by researchers, showing strong performance across a range of conditions.

Beyond speed, the platform also emphasizes scientific rigor. Each step in EMSeek's process includes checks for consistency and accuracy, helping to ensure that results are transparent and reproducible. The platform can also draw on published literature to provide context for its interpretations, reducing the risk of unsupported claims. *(Source: Guangyao Chen et al, Science Advances (2026).*