

# KETI develops breakthrough in solid-state battery technology with silver nanoparticles

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**KETI, alongside Seoul National University and Chung-Ang University, enhances battery performance and safety by integrating silver nanoparticles into solid electrolytes**

The Korea Electronics Technology Institute (KETI), in collaboration with research teams from Seoul National University and Chung-Ang University, has developed a breakthrough in solid-state battery technology. This advancement involves the self-formation of silver (Ag) nanoparticles within the solid electrolyte, which enhances battery performance and life span by preventing dendrites and short circuits.



Source: 1020067494 – Getty Images/nevodka

Dendrites, which are sharp, thorn-like structures formed by uneven lithium growth, have been a significant challenge in all-solid-state batteries, affecting battery life and safety. The KETI research team created a solid electrolyte mixed with silver ions that transform into metal nanoparticles during initial battery charging. This transformation allows even lithium plating, suppressing dendrite formation and improving battery longevity.

This novel technology can be integrated directly into existing solid electrolyte manufacturing methods without additional protective films or processes, facilitating its potential for commercialization. Tests have shown stable charge-discharge performance and high-energy density, indicating suitability for electric vehicle batteries.

By removing the anode material, anode-free all-solid-state batteries theoretically increase energy density by over 30%. However, issues with lithium's uneven growth due to the solid electrolyte's poor reaction were a major obstacle, which the new technology addresses.

Choi Seung-ho, a KETI senior researcher, highlighted that the technology changes the solid electrolyte structure to be more lithium-friendly and can be applied in mass production, marking a significant breakthrough in the all-solid-state battery market. This work was developed under the Alchemist Project, supported by the Ministry of Trade, Industry and Energy and the National Research Council of Science & Technology, with plans to further accelerate the development of high-energy density battery materials.

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