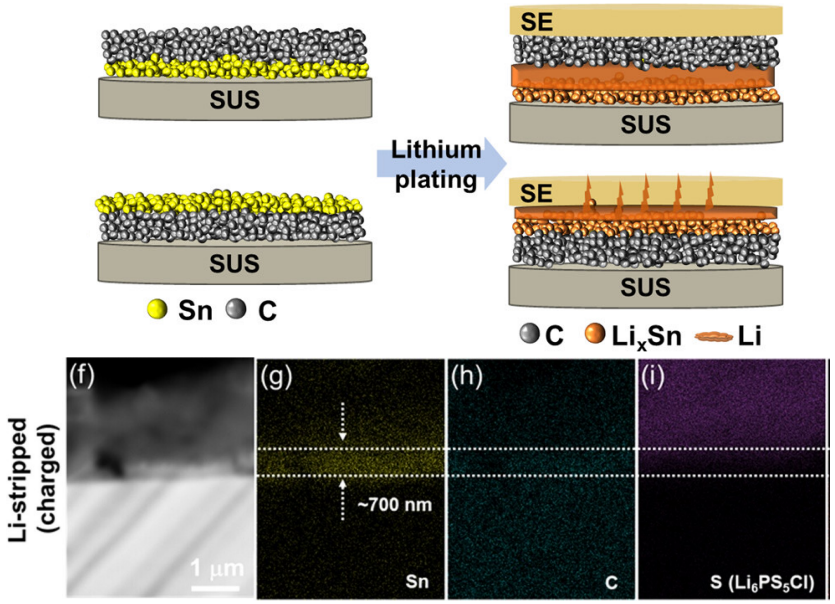
Tin–Carbon Dual Buffer Layer Suppresses Lithium Dendrites

Scientific Achievement

Tin and carbon deposits on a stainless-steel current collector achieve uniform lithium–metal plating and improve cycling performance in all solid-state batteries.



The all-solid-state battery showed uniform Li plating/stripping due to the novel Sn/C buffer layer deposited onto a stainless-steel current collector.

Significance and Impact

SUS/Sn/C buffer layer shows stable Li plating/stripping cycling over 450 cycles without noticeable short-circuit

Research Details

- The order of the layer matters; a Sn/C buffer layer is more effective in suppressing lithium dendrite growth and improving cycling stability than a C/Sn buffer layer.
- The Sn metals result in a uniform lithium–metal deposition on the current collector and the carbon layer acts as a physical barrier to suppress the lithium dendrite growth toward the solid electrolyte because of its lithiophobic nature.

Work was performed, in part, at the Center for Integrated Nanotechnologies.

Avvaru, V. S.; Ogunfunmi, T.; Jeong, S.; Diallo, M. S.; Watt, J.; Scott, M. C.; Kim, H., Tin–Carbon Dual Buffer Layer to Suppress Lithium Dendrite Growth in All-Solid-State Batteries. ACS Nano 2025.