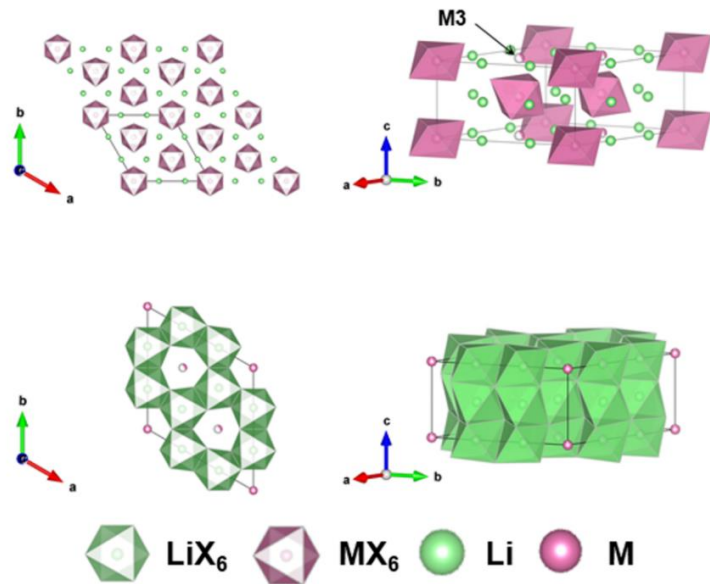


New Halide Electrolytes for Solid State Batteries



The image shows the atomic crystal structure and Li⁺ migration pathways that enhance the Li-ion transport through the new halide solid electrolyte material.

Scientific Achievement

Scientists found new, cost-effective halide solid electrolytes for all-solid-state batteries that are free of rare-earth metals.

Significance and Impact

Halide solid electrolytes (superionic conductors) offer both excellent (electro)chemical stability and the ability to form good solid-solid contacts for solid-state Li batteries. Until now, the use of expensive metals has hindered their practical application.

Research Details

- Mechanochemically synthesized halide superionic conductors, Li_{2+x}Zr_{1-x}Fe_xCl₆, using inexpensive & abundant elements.
- Demonstrated the significantly improved ionic conductivity due to Fe³⁺ substitution.
- Combined structural analysis using the PDF beamline at NSLS-II with other tools to reveal the origin of the high ionic conductivity in new halide solid electrolytes.

H. Kwak, D. Han, J. Lyoo, J. Park, S. H. Jung, Y. Han, G. Kwon, H. Kim, S.-T. Hong, K.-W. Nam, Y. S. Jung. *Adv. Energy Mater.*, **11**, 2003190 (2021).

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