

https://doi.org/10.62422/978-81-981865-7-7-002

Phosphate-Based Glass Electrolytes in Solid-State Lithium-Ion Batteries: Overcoming Development Challenges



Hicham Es-soufi National Higher School of Chemistry (NHSC), Ibn Tofaïl University, BP. 133-14000, Kenitra, Morocco

All-solid-state lithium-ion batteries (ASSLIBs) are emerging as promising alternatives to conventional batteries with videspread adoption is hampered by challenges in developing effective solid electrolytes. Phosphate glassy electrolytes have attracted attention as a viable solution, offering high lithium-ion conductivity, robust chemical stability, and excellent compatibility with lithium metal anodes. This review summarizes our earlier work on phosphate glassy electrolytes for ASSLIBs, focusing on strategies to overcome critical industrial hurdles. It discusses various elements such as synthesis methods, structural properties, and electrochemical performance, with particular emphasis on enhancing ionic conductivity, mechanical resilience, and interface stability. The review also explores how these electrolytes are integrated into ASSLIB designs and interact with diverse cathode materials, and it outlines future research directions that could enable the next generation of lithium-ion battery systems to overcome existing limitations and achieve safer, more efficient energy storage.

Biography:

Dr. Hicham Es-Soufi is a Professor at the National Higher School of Chemistry (NHSC) at Ibn Tofail University in Kenitra, Morocco. He has previously served as the Director of Studies and Professor at the Higher School of Engineering, ESGCNT, in Meknès, Morocco. Dr. Es-Soufi is an active member of the editorial boards of four international scientific journals and has contributed as a peer reviewer for over 45 international journals.

His research focuses on the development of innovative materials, with a strong emphasis on the physical-chemistry of materials for applications in electrochemical and electrostatic energy storage, wastewater treatment, corrosion prevention, and gamma radiation shielding. Dr. Es-Soufi has published more than 50 papers in renowned international scientific journals, reflecting his significant contributions to the field.