

New trends in electrolyte materials for solid batteries operating at ambient temperature

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The always increasing role of smart technology in modern society requires the development of advanced energy storage systems, which can be used in portable electronic devices as well as in electric and hybrid/electric vehicles and in large stationary storage systems. In this scenario, lithium-ion batteries represent the mostly efficient and widely exploited technology at present. However, especially for applications where safety and low cost are essential requirements, alternative technologies such as Na-ion batteries and/or alternative post-Li systems are being intensively investigated.

This contribution will provide an overview of the recent trends regarding the development of highly ionic conductive crosslinked polymer electrolytes with wide electrochemical stability, mechanical properties for safe and aging resistant lithium- and/or sodium-based batteries operating at ambient temperature. Noteworthy, the GAME Lab focuses its research activity on the study and development of innovative, high performance and low environmental impact materials through the use and optimization of original, clean, simple, low cost preparation procedures easily scalable at an industrial level.

References

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Claudio Gerbaldi graduated in 2002 and got his PhD in Material Science and Technology at the Politecnico di Torino in 2006. He is an Associate Professor of Fundamentals of Chemical Technology at the Politecnico di Torino. He is the leader of the Group for Applied Materials and Electrochemistry (GAME-Lab) at the Department of Applied Science and Technology – DISAT. He has more than 17 years of experience on electrochemical energy storage (mainly, Li-/Na-based batteries) and conversion (mainly, dye-sensitized solar cells) devices with a specific focus on the development of advanced polymer electrolyte membranes by light-induced and thermal polymerisation techniques, as well as bio-inspired nanostructured electrode materials by sustainable water-based production techniques. In the last 5 years, he has been scientific coordinator at the Politecnico di Torino of 4 EU H2020 projects on the development of solid-state batteries and 3 research contracts with large companies like Toyota and Solvay on the same topic. He is author/co-author of about 131 scientific research articles published in international ISI journals (average I.F. > 5) with >1000 annual citation counts in recent years (>4400 total citations) and h-index 42. He participated in > 70 national/international conferences (>100 oral talks and/or poster presentations), 12 as a distinguished invited/keynote speaker. He is member of the Executive Committee of the Electrochemistry Division of the Italian Chemical Society. Among others, he has received the Piontelli Award for outstanding results in Electrochemistry from the President of the Italian Republic (2015) and the “UniCredit Award” for the Young Innovation in Research (2007).

