From materials synthesis to lithium metal batteries

Thursday October 26, 2023 – 11:00

ON-SITE - S3 Seminar Room, Third Floor, Physics Building
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Speaker

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Abstract

Lithium batteries represent a promising technology for enabling global electrical mobility via electric vehicles (EVs), which can help reduce CO2 emission from the combustion of gasoline (ICEs). Lithium metal is considered as one of the top alternative anodes for the next generation of rechargeable batteries owing to its high energy (~4000 mAh/g) compared to the traditional graphite (~370 mAh/g). Indeed, when graphite is replaced by metallic lithium at the negative electrode, it may deliver practically specific energies more than double the values of today’s lithium-ion batteries, depending on the cathode chemistry. However, in actual practice, the use of lithium metal as an anode with a flammable liquid electrolyte is limited by the formation of lithium dendrites, which may cause battery short circuits and safety issues. The use of solid electrolyte can stop Li-metal dendrites propagation acting as a physical barrier. In this presentation I will report the last findings about the optimization of low cost and safe oxides/phosphates-based solid electrolyte materials synthesis (garnet-type LLZO, NASICON-type LAGP and LATP) and their densification process by using hot-pressing method. Moreover, to follow Li-metal plating/stripping process in lithium metal batteries a modified coin cell was developed for in-situ X-rays diffractions analytical method.

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