

The Electrochemical Sodiation of FeSb_2 : New Insights from Operando ^{57}Fe Synchrotron Mössbauer and X-Ray Absorption Spectroscopy



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The front cover artwork is provided by Marcus Fehse at the ESRF (France) and collaborators. Graphical editing support by Alexandra Moullec is kindly acknowledged. The image demonstrates how synchrotron radiation is important to study battery materials for many different applications. Read the full text of the Article at 10.1002/batt.201800075.

What are the main challenges in the broad area of your research?

Our research team at ICGM is centred on the development of new electrode materials for battery applications. Our work goes from the synthesis of new materials, to the study of their electrochemical mechanism, to their application in batteries and the evaluation of their life cycle. Within this framework, our aim is to develop new in situ and operando tools for the study of the electrochemical mechanisms in lithium and post-lithium batteries.

What prompted you to investigate this topic?

The understanding of the role of iron in the specific performance of FeSb_2 was supposed, but could not be proven with certainty before. In this work, we apply two complementary operando synchrotron-based techniques to unveil its role.

What are the most significant results of this study?

The two main achievements of this work are: 1) The first application of synchrotron-based ^{57}Fe Mössbauer spectroscopy for the operando study of iron-based electrode materials, a

technique of choice for materials that cannot be investigated by conventional laboratory Mössbauer spectroscopy; 2) The consolidation of the use of chemometrics for the thorough exploitation of operando data in the study of electrochemical mechanisms in batteries.

Is your current research mainly curiosity driven (fundamental) or rather applied?

The main driving force of our team is the creation of new knowledge, but the urgency of solving crucial issues for the planet Earth makes application orientation our responsibility.

What other topics are you working on at the moment?

The optimisation of lithium-based and the development of post-Li systems are currently running topics in our group.

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