

"Ions, isotopes and surfaces: ion beam analysis of materials for energy storage and conversion"

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Resumen

Any sustainable energy scenario will involve the use of solid state ionic conductors in a variety of high and low temperature electrochemical devices for the storage and conversion of renewable energy. Devices include Li and Na batteries, solid oxide fuel cells and electrolyzers. The underpinning science behind all of these devices is an understanding of the transport of ions, both cations and anions, through the bulk of the materials and across surfaces and interfaces. Ion beam based techniques can bring many insights into this fascinating topic by providing both compositional and kinetic data. Examples that will be given include the investigation of oxygen 18 isotopic exchange across the surface of solid oxide fuel cell components, especially cathodes and oxygen transport and studies of grain boundary transport in ionic conductors using Secondary Ion Mass Spectrometry (SIMS). Finally details will be given of the application of a new technique, Low Energy Ion Scattering (LEIS), to the changes of surface composition in electrode materials following high temperature treatment and its effect upon gas solid interactions.



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