SFB 595 Deutsche Forschungsgemeinschaft DFG

Sonderforschungsbereich 595

Elektrische Ermüdung in Funktionswerkstoffen

TECHNISCHE UNIVERSITÄT DARMSTADT

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Atomic transport and intercalation in thin film battery materials

Current demand for convenient energy storage has initiated intensive battery research. A conventional Li ion battery pack comprises powder-structured electrodes and liquid ionic conductors. Complexity of these systems hinders clear physical studies of atomic transport. Therefore, the talk presents opportunities to produce electrodes, membranes and batteries as well-defined solid thin films. Cathode materials like $LiFePO_4$, $LiCoO_2$, or Vn_2O_5, anode materials like Sn and $Li_4Ti_5O_{12}$ and ion-conductive membranes like LiPON or other oxide glasses are deposited by reactive ion beam sputter deposition in a thickness range of a few tens of nanometers. For each case, optimized deposition conditions are identified. Correct structure and chemical composition are verified by diffraction, electron energy loss spectroscopy or atom probe tomography. The proper electrochemical functions, storage capacity and reversibility, are demonstrated by cyclo-voltammetry or chrono-amperometry.
As a main advantage, sputter-deposition allows perfect control of layer thickness. The talk demonstrates how impedance spectroscopy and measurement of electrochromaticity under controlled variation of layer thickness may be used to determine and possibly understand kinetic properties and intercalation behavior of ion-conductive materials.

Die Vortrag findet um **16:15 Uhr** im Gebäude der Materialwissenschaften, Lichtwiese, Petersenstr. 23, **Raum 77** statt