Oxide Thin Film Li-Battery Materials: Synthesis, Interface Properties and Electrochemical Performance

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We will introduce our approach to prepare and investigate thin film materials for application in all solid state batteries by using integrated UHV preparation facilities. For thin film synthesis different thin film technologies have been applied as magnetron sputtering, chemical vapor deposition/synthesis or physical vacuum deposition. The thin films have been studied using photoelectron spectroscopy (XPS, UPS, Resonant Photoemission (ResPES)) for investigating the occupied valence band states and x-ray absorption near edge spectroscopy (XANES) for investigating unoccupied conduction band states. The experimental data will be compared to theoretical calculations and are correlated to electrochemical data. In addition, the electrochemical performance of the battery materials have been investigated mostly addressing chemical surface reactions and contact formation. Such investigations allow a better insight into the thermodynamics of intercalation but also into the mechanisms of concurrent reactions which may lead to the capacity loss of batteries with cycling.