FOXSI
Functional Oxide Surfaces and Interfaces

EINLADUNG

zum Vortrag
von

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Germany

Nature of the resistive switching in transition metal oxides

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Technische Universität Wien, Fakultät für Technische Chemie
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1060 Wien, Getreidemarkt 9

Abstract:

The understanding of the nature of the reversible transformation of binary or ternary oxides from a non-conducting to a metallic state (resistive switching (RS)) by an external electric field or a chemical gradient necessitates a change of the ideas concerning the role of different kind of defects in such transformation. In contrast to the dominating "philosophy" that only Schottky disorder should be important for the modification of the electrical transport phenomena in multinary transition metal oxides, our study of the RS phenomena at the nano-scale demonstrate that the reversible insulator-to-metal transition takes place along of extended defects, especially edge dislocations. Extended defects represent *per se* an imperfection in the perfect crystallographic matrix of the oxides. They provide easy diffusion path for oxygen throughout the crystal and allow - via thermal reduction or electro-reduction - modification of the defects themselves as well as the region close to them. In this way, a perfect nano-wire (so called filament) with metallic properties can by created. In my lecture, I will explain that after appropriate electrical or chemical stimulus the metallic state in model oxides, such as binary TiO_2 and ternary SrTiO3 and BaTiO3, is indeed limited to only the core of dislocations (about 1nm), whereas the rest of the crystal remains absolutely non-conducting.

FWF SFB F45 „Functional Oxide Surfaces and Interfaces (FOXSI)"
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