

ELECTRICAL CHARACTERISATION OF AN OXIDE-PN-JUNCTION UNDER ILLUMINATION

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Because of the chemical stability and the small lattice mismatch, strontium titanate (STO) is a widely used substrate material for many perovskite oxides. In addition, the conductivity can be tuned by doping with Nb from insulating to a low-resistance behaviour. Therefore, the n-type Nb:STO is of particular importance for the fabrication of novel devices.

In this work thin films of p-type praseodym calcium manganate are grown on Nb doped STO by ion-beam-sputter-deposition to fabricate an oxide-pn-junction. In particular the electrical contact to the substrate is important, so different metal-Nb:STO-interfaces were examined. For high work function metals like Ag and Au non-linear current-voltage-characteristics were found, while ohmic contact to the substrate was achieved by aluminium and titanium electrodes with a gold coating.

The oxide-pn-junction shows diode-like behaviour like a conventional semiconductor junction, but in four-wire-configuration a slightly hysteretic behaviour is found. A clear photovoltaic effect, depending on the intensity of light, can be observed under illumination with a mercury vapour lamp (fig. 1). First results of the interface-structure examined by transmission electron microscopy will be presented.

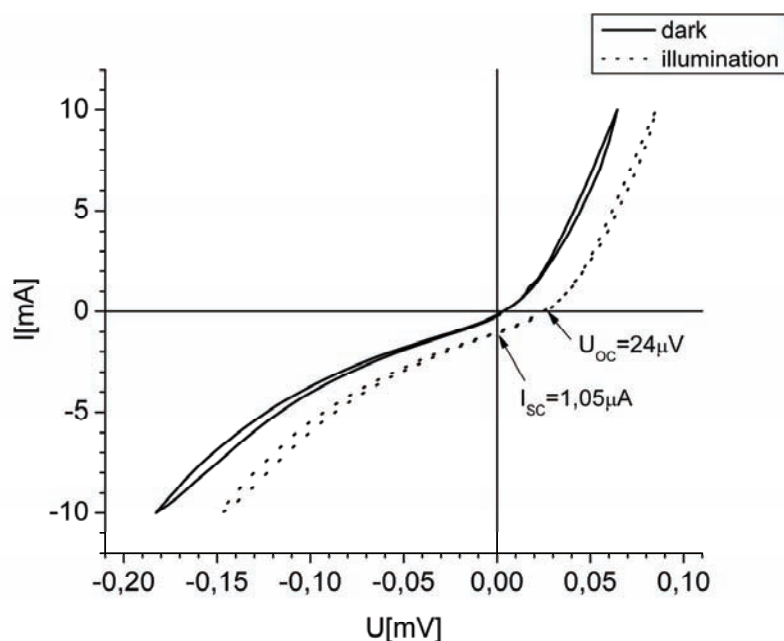


Fig. 1. Oxide-pn-junction under illumination with mercury vapour lamp (four-wire-configuration).