



Sonderforschungsbereich 595 Elektrische Ermüdung in Funktionswerkstoffen



TECHNISCHE
UNIVERSITÄT
DARMSTADT

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Dr. Yuriy Nikolaenko

*Donetsk Institute for Physics & Technology, National
Academy of Sciences of Ukraine*

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Electrical conductivity and mobility of oxygen anions in $\text{In}_2\text{O}_{3-\delta}$: Sr and $\text{In}_2\text{O}_{3-\delta}$: Sn

In the presentation the electrical characteristics of Sr-doped polycrystalline indium oxide will be discussed for the case of deviations from the stoichiometric oxygen composition. Doping by Sr considerably decreases the electrical conductivity of In_2O_3 and makes it extremely sensitive to variations in the oxygen content. A small oxygen deficiency of the samples corresponds to the high-resistance state, which is formed as a result of the decrease of both of charge carrier concentrations and the transparency of potential barriers at the crystallites' boundaries. The increasing oxygen deficiency in $\text{In}_2\text{O}_{3-\delta}$: Sr restores a high *n*-type electrical conductivity, which is consistent with the concepts of oxygen vacancies as shallow donors. For a sufficiently high oxygen deficiency, the potential barriers do not manifest themselves; however, with increase of the oxygen content a potential relief arises leading to remarkable effects such as: a) the specific nonlinearity and hysteresis of the current-voltage characteristics caused by the *tunnelling transparent* potential barriers; b) an increase in the low-frequency electrical permittivity from usual 9.2 up to 13.3 measured at $T = 77$ K. The physical mechanisms of temporal and spatial variations of conductance in the oxygen deficient $\text{In}_2\text{O}_{3-\delta}$: Sr and $\text{In}_2\text{O}_{3-\delta}$: Sn samples are also discussed.

Der Vortrag findet um **14:00 Uhr** im Gebäude der Materialwissenschaften,
Lichtwiese, Petersenstr. 23, **Raum 128** statt