

Contributed Talk

Single Nanowire based Nanosensors

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Noble metals, such as Pd, Ag, Pt, Au and Ru, are known to be very effective catalysts and help in the improvement of the metal oxides sensing properties. A series of methods have been proposed to incorporate these metals into oxides nanostructures to improve the sensing performances. Enhanced properties were obtained for nanosensors based on a single nanowire (NW) of noble metal-doped zinc oxide as well as for noble metal - functionalized one. Crystalline nanowires of semiconducting oxides were synthesized by thermal growth or electrodeposition and studied by scanning electron microscopy SEM, EDX, TEM, HRTEM, SIMS, X-Ray photoelectron spectroscopy, PL and micro-Raman spectroscopy. Integration of a single NW on the chip was performed by using metal maskless nanodeposition in the dual beam focused electron/ion beam instrument. The ultraviolet (UV) and gas response were studied for nanosensors based on a single NW. We found that ZnO:Ag NW based nanosensors possess a much faster response/recovery times than those reported in literature. Also, nanosensors based on a single CuO NW or Fe₂O₃ NW have been successfully fabricated and studied in details. The developed nanosensors are of high scientific and engineering interest as candidates for fabricating multifunctional detectors.

Dr. Lupan acknowledges the Alexander von Humboldt Foundation for the research fellowship for experienced researchers 3-3MOL/1148833 STP at the Institute for Materials Science, University of Kiel, Germany. This work was partially supported by the STCU within the Grant 6229.

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