Increased Sensitivity of a Gas Sensor by Controlled Extension of TiO_2 Active Area

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Abstract. In this article we deal with the preparation of nanostructured patterns of sputtered thin-film titanium dioxide surfaces. Such nanostructured surfaces are implemented into sensoric structures and are measured for the presence of gases, for detection of which we used a thin layer of polycrystalline TiO_2 deposited on a resistive layer of SiO_2. The basic principle of gas detection is the change in conductivity of thin TiO_2 layer after gas exposure, and controlled geometrical extension of this area is the basic mechanism for increasing the sensor's sensitivity. Another possibility to extend the surface of a gas sensor is by ICP etching through a suitable masking material or, eventually, a combination of both mentioned techniques. In order to increase the active area of TiO_2 we compare here samples prepared by cylindrical and cuboidal geometries of the sensor's active surface and show TiO_2 surface modifications after their ICP plasma treatment.