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Chemo-resistive gas sensors – materials' aspects

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Chemo-resistive gas sensors are the electronic devices that exhibit significant changes in their electrical resistance upon admission of certain oxidizing or reducing chemical species. Metal oxides such as SnO_2 , MoO_3 , TiO_2 , CuO , are well-known materials usually applied as gas sensors. These materials can be synthesized in different forms ranging from bulk ceramics to thin films. Thin-film technology has contributed significantly to the development of reliable chemical sensors as it is easily controllable and results in reproducible parameters of the deposited layers. Moreover, it is compatible with interdigitated transducer IDT electrodes which provide electrical contacts to the resistance measuring units. Emerging nanotechnology has led to a revolution in chemical sensing especially as far as different forms of nanomaterials have demonstrated better response, sensitivity and selectivity. Moreover, the nanostructured sensors can operate much faster due to better kinetics of responses at room temperature. The aim of this contribution is to review the most recent work performed in the field of chemo-resistive gas sensor with a special emphasis on the materials' aspect.