

Metal-Oxide Thin Film with Pt, Au and Ag Nano-Particles for Gas Sensing Applications

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In this paper, we report an experimental study carried out to synthesize noble-metal nanoparticles on a polycrystalline ZnO film for gas sensing applications. The necessary process parameters are optimized to achieve the desired morphologies of Pt, Au and Ag nano-particles along with the base layer of ZnO on an alumina substrate. Observations on the formation of nano-particles on the ZnO film are made using scanning electron microscope (SEM) and the results are presented. A detailed study is performed on the formation of nanoparticles on a ZnO film using SEM, and the results are discussed. The responses of the samples with and without nanoparticles are studied with oxygen as test gas. The samples with noble-metal nanoparticles exhibit enhanced sensitivity compared with those without nanoparticles. It is also observed that, with an increase in the operating temperature of ZnO films, the samples show further improvement in sensitivity. In addition, the samples with nanoparticles show fast initial recovery behavior.

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