Development of Metal Oxide Based Solid State Gas Sensor Platform

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Gas sensors are chemical sensors which have a transducer and an active layer for converting the chemical information into another form of electronic signal. Gas detection and determining the composition of a gas in a mixture is necessary in many different fields. In this research, development of metal oxide based sensing material layer and design of sensor platform were on focus. SnO_2 was selected as the main precursor of the sensing material and Mn as the dopant. Material deposition was done by spin coating method on soda lime glass substrate. The complete platform consists of sensor material, heating element, temperature monitoring and control unit, Arduino board for data acquisition and signal processing. The temperature dependence of resistivity of SnO_2 film was studied in detail in the presence of different gases and gas mixtures. The results shows that the Mn doped spin coated SnO_2 thin film is a promising method for the preparation of high quality ethanol sensor even in a mixture of ethanol and acetone. Optimum sensitivity for ethanol was obtained at 140^0C - 160^0C temperature range.