



DEVELOPMENT OF WET FILM AND GEL CAST TEMPLATE FOR
GAS/MOISTURE SENSOR

ABSTRACT

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DEVELOPMENT OF WET FILM AND GEL CAST TEMPLATE FOR GAS/MOISTURE SENSOR APPLICATIONS

Key words: Moisture sensor, Sol-gel, Thin film, Thick film, Gel cast, PPMv, γ -Al₂O₃

Together with temperature, humidity is a very important process variable. The relative humidity of an environment has a major effect on our sense of well being and state of health. In industrial processes, the right humidity level is often a determining factor in the competitiveness and quality of products. A correctly adjusted humidity level can also contribute to considerable savings in energy consumption; and the present fact is that humidity sensing studies have progressed rapidly and humidity sensors—regardless of fabrication technique. Amongst the various humidity evaluation terms and units, relative humidity are the most prevalent vis-à-vis absolute humidity; and in the majority of humidity measurement applications, relative humidity measurements are more preferable than absolute humidity ones.

In this thesis , we report our research findings on the realization of the capacitive humidity sensor produced by sol-gel technology. Sol-gel is a chemical solution process used to make ceramic and glass materials at low temperature in the form of thin films, fibers, or powders in which sol is a colloidal or molecular suspension of solid particles of ions in a solvent. Sol-gel technology has received much attention in recent years in the field of technological application. The reason behind that it is a low cost, easier fabrication and precisely composition control process. On the other hand, the sol-gel is suitable for preparing the porous material when the solvent from the sol begins to evaporate and the particles or ions left behind begin to join together in a continuous network that forms a lot of cavities.

Result shows that Al₂O₃ thin films could form a good porous layer with a pore size in the range of nanometers for trace moisture sensors also. We report highly sensitive moisture sensor based on aluminium oxide material with nano size pore distribution and have shown high sensitivity in the range of ppm and to the best of knowledge no one has achieved such results using such simple technology. The developed sensors even show high sensitivity and excellent selectivity .

BRIEF PROFILE

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I received B.A.Sc(Hons.)degree from Delhi University, in Electronics and M.Sc. in Electronics from Jamia Millia Islamia. I have carried out my research work, on the topic of “Development of Wet Film and Gel Cast Template for Gas/Moisture Sensor Applications”, at the Department of Applied Sciences & Humanities, Jamia Millia Islamia, New Delhi.