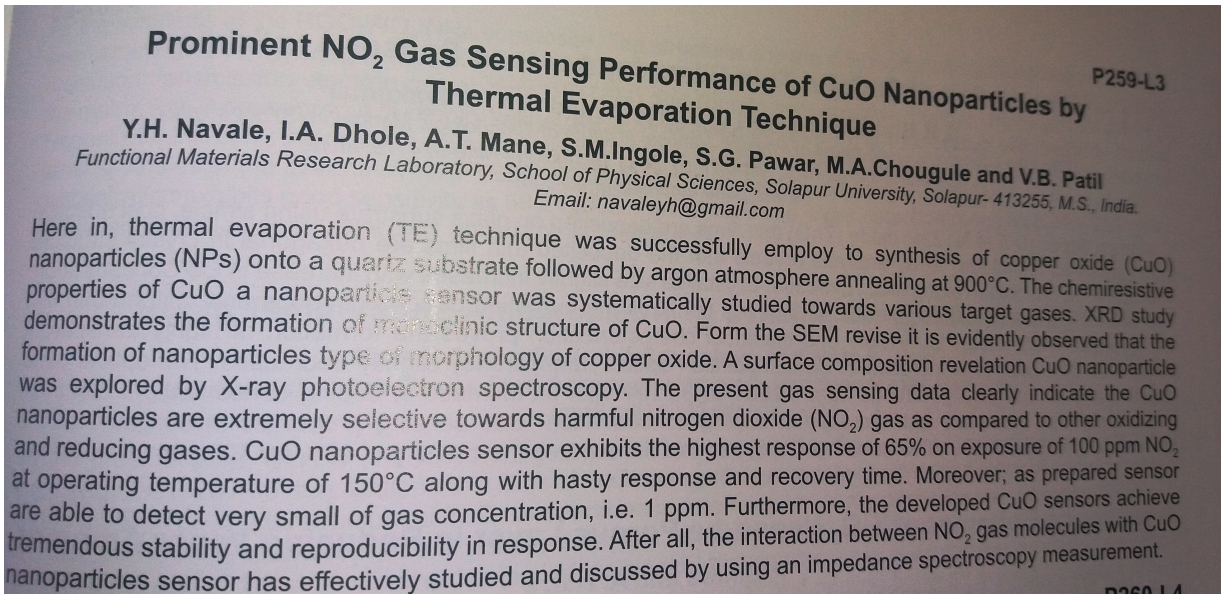

Prominent NO_2 Gas Sensing Performance of CuO Nanoparticles by Thermal Evaporation Technique

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Here in, thermal evaporation (TE) technique was successfully employ to synthesis of copper oxide (CuO) nanoparticles (NPs) onto a quartz substrate followed by argon atmosphere annealing at 900°C. The chemiresistive properties of CuO a nanoparticle sensor was systematically studied towards various target gases. XRD study demonstrates the formation of monoclinic structure of CuO. Form the SEM revise it is evidently observed that the formation of nanoparticles type of morphology of copper oxide. A surface composition revelation CuO nanoparticle was explored by X-ray photoelectron spectroscopy. The present gas sensing data clearly indicate the CuO nanoparticles are extremely selective towards harmful nitrogen dioxide (NO_2) gas as compared to other oxidizing and reducing gases. CuO nanoparticles sensor exhibits the highest response of 65% on exposure of 100 ppm NO_2 at operating temperature of 150°C along with hasty response and recovery time. Moreover; as prepared sensor are able to detect very small of gas concentration, i.e. 1 ppm. Furthermore, the developed CuO sensors achieve tremendous stability and reproducibility in response. After all, the interaction between NO_2 gas molecules with CuO nanoparticles sensor has effectively studied and discussed by using an impedance spectroscopy measurement.

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