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## Low dimensional nanostructured materials as room temperature liquefied petroleum gas sensor

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In the present work, ferric oxide nanonails, nanorods and mixed shaped (nanospheres/nanocubes) copper ferrite were prepared by screen printing method and their liquefied petroleum gas sensing at room temperature were investigated. The structural, surface morphological, optical, electrical as well as LPG sensing properties of the ferric oxide and copper ferrite were investigated. SEM images of ferric oxide show nanonails type of morphology throughout the surface. Single phase spinel structure of the  $\text{CuFe}_2\text{O}_4$  was confirmed by XRD data. The minimum crystallite size of copper ferrite was found 25 nm. The sensing films were made by using screen printing technology and investigated with the exposure of LPG. The variations in electrical resistance of the film were measured with the exposure of LPG as a function of time. Our results show that the mixed shaped  $\text{CuFe}_2\text{O}_4$  had an improved sensing performance over that of the  $\text{CuFe}_2\text{O}_4$  nanorods, of which a possible sensing mechanism related to a surface reaction process was discussed. Sensor based on mixed shaped copper ferrite is 92% reproducible after one month. The role of PEG in the synthesis for obtaining nanospheres/nanocubes has also been demonstrated. The activation energy of ferric oxide calculated from Arrhenius plot was found 0.95 eV. The response and recovery time of ferric oxide film were found ~120 s and 150 s respectively.

### Biography

B. C. Yadav has received his Ph.D. degree in 2001 from Department of Physics, University of Lucknow, India. Currently he is an Associate Professor/Coordinator of Department of Applied Physics, School for Physical Sciences in the Babasaheb Bhimrao Ambedkar University, Lucknow. He is recipient of prestigious Young Scientist Award-2005 instituted by the State Council of Science and Technology. Also Dr. Yadav was selected for Brain Pool International Fellowship of South Korea in 2011. He has published more than eighty five research/review papers in reputed international journals. His current interests of research includes the synthesis of metal oxides nanoparticles, metallopolymers, etc., characterizations and their applications as sensors.

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