

## **Structural and gas-sensing properties of CuO-Cu<sub>x</sub>Fe<sub>3-x</sub>O<sub>4</sub> nanostructured thin films.**

### **ABSTRACT**

Nanocrystalline CuO-Cu<sub>x</sub>Fe<sub>3-x</sub>O<sub>4</sub> thin films were developed using a radio-frequency sputtering method followed by a thermal oxidation process. Thin films were deposited applying two very different conditions by varying the argon pressure and the target-to-substrate distance. Structural, microstructural and gas-sensing characteristics were performed using grazing incidence X-ray diffraction (GIXRD), Raman spectroscopy, atomic force microscopy (AFM), X-ray photoelectron spectroscopy (XPS), transmission electron microscopy (TEM), scanning electron microscopy (SEM), and electrical measurements. Their sensing properties were examined using hydrogen gas in dry synthetic air. The shortest response and recovery times were observed between 280 and 300 °C independently of the deposition conditions.

**Keyword:** Copper oxide; Nanocomposite; Spinel ferrite; RF-sputtering; Gas sensor.