

Rapid and Highly Selective Detection of H₂S by Ag and Ni doped CaCu₃Ti₄O₁₂ Film Sensors

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Abstract

The detection of toxic gases such as H₂S is relevant in the food industries in the maintenance of the sewage system and health science. We have achieved sub-ppm sensitivity toward H₂S by using Ag and Ni doped CaCu₃Ti₄O₁₂ (CCTO) thin films prepared by a cost effective sol-gel method. Ag and Ni doped CCTO films were found to be remarkable sensors towards H₂S in the concentration range of 0.2-10 ppm. When compared with undoped CCTO sensors, Ag and Ni dopants cause a dramatic improvement of the response towards H₂S gas up to 10 times higher. These film sensors typically operated at ca. 250 °C and showed much shorter response times than that of undoped one. The operating principle of gas sensing mechanisms have been proposed.

Keywords: Ag-doped CaCu₃Ti₄O₁₂; Ag-doped CaCu₃Ti₄O₁₂; H₂S sensor