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Er-enhanced humidity sensing performance in black ZnO-based sensor

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Abstract

Er doped and undoped black ZnO nanocrystallines have been synthesized through a facile wet chemical method. The influence of Er doping on the humidity sensing properties was explored by varying the dopant concentration. The undoped ZnO hardly responded to different ambient humidity and the best result appeared in Er3% doped sample under the same preparation condition. The Er3%:ZnO sensor showed a high resistive sensitivity, which varied by more than three orders of magnitude with increasing the relative humidity from 11% to 95%. The hysteresis was relatively small and the response times were about 32.3 s and 39.6 s, respectively. These experiment results suggest the rare earth metal dopant Er is very effective in improving the sensing performance of black ZnO.

Keywords: Humidity sensor; Black ZnO; Rare-earth metal Er; Enhanced sensing performance

1. Introduction

Humidity sensors have gained considerable attention due to the wide application

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