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RESEARCH ARTICLE | JULY 10 2023

Influence of calcination temperature on microstructural features and ethanol sensing behaviours of mesoporous SnO_2 powder synthesized by soft-template method

N. I. Basir; M. Y. Ahmad; J. Jusliha; A. Z. Abdullah; M. Z. Abu Bakar
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AIP Conf. Proc. 2785, 030013 (2023)
https://doi.org/10.1063/5.0149825

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Mesoporous SnO_2 powders have been synthesized through soft-template method by incorporating cetyltrimethylammonium bromide (CTAB), as structure directing agent. The as-synthesized sample were calcined at 400, 500, and 600°C and they are being characterized by Thermogravimetric Analysis (TGA), X-ray Diffraction (XRD), Transmission Electron Microscopy (TEM) and N_2 adsorption-desorption experiment. Sample synthesized at 400°C has smaller crystallite and particle size, less agglomerated and high surface area compared to the sample prepared at 500, and 600°C. Thick-film gas sensors were fabricated using synthesized SnO_2 powder via screen-printing technique, and the sensing response of the sensors to 1000 ppm ethanol gas were investigated at different operating temperatures. Sensor using sample calcined at 400°C gives the highest sensitivity, S= 26.4 at 300°C operating temperature.

Topics
Sensors, Thermogravimetric analysis, Transmission electron microscopy, Transition metal oxides, Organic compounds, Calcination, Surface and interface chemistry, Surfactants, X-ray diffraction

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Topics

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