ELECTRONIC SUPPLEMENTARY INFORMATION

Impact of Cu doping on the structural, morphological and optical activity of V_2O_5nanorods for photodiode fabrication and its characteristics

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TG/DTA Studies

Thermo-gravimetric analysis/differential thermal analysis (TGA/DTA) was carried out using NETZSCH-STA, 449F3-JUPITER, at a heating rate of 10°C/min in N_2 atmosphere. Fig. S1&S2 shows the TG-DTA curves are recorded at 10°C/min up to 1000°C for the thermal decomposition of pure and $Cu_xV_2O_5$ (x=Cu 7 at.%) samples in nitrogen atmosphere. In the figure, the TG curve of pure V_2O_5 is exhibit well-defined weight loss step. The weight loss of 2.8% at R_T to 1000ºC can be attributed to the release of water molecules adsorbed on the surface of the studied sample for below temperature up to 200°C. It is characterized by a broad endothermic DTA peak at 678°C suggests that the melting point for V_2O_5 at 680°C [1]. From Fig. S2 illustrates the TG-DTA curve of $Cu_xV_2O_5$ sample which is roughly three stages of thermal weightlessness corresponding to the physical or chemical reactions. In TGA, the continuous change in weight of a studied sample occur either due to desorption of fraction of volatile contents (weight loss) or absorption of gaseous components from the surrounding atmosphere (weight gain) as a function of temperature. In the figure, the first step up to ~220°C with a weight loss of 0.8 and 10.3% and an endothermic peak at 217.4°C is due to the dehydration of the absorbed water molecules on the surfaces. The second step between 220°C and 400°C, with a weight loss of 4.7 and 6.0% and an endothermic peak at 324.1°C and exothermic peak at 393°C which is attributed to the decomposition of the trace absorbed organic molecules in the material. The third step beyond 800°C, with a weight loss of 1.7% and an endothermic peak at 716.2°C. The strong endothermic peak shifted from 678°C to

716.2°C upward and the peak became sharper, which was beneficial for doping of Cu in V_2O_5 crystal lattice.

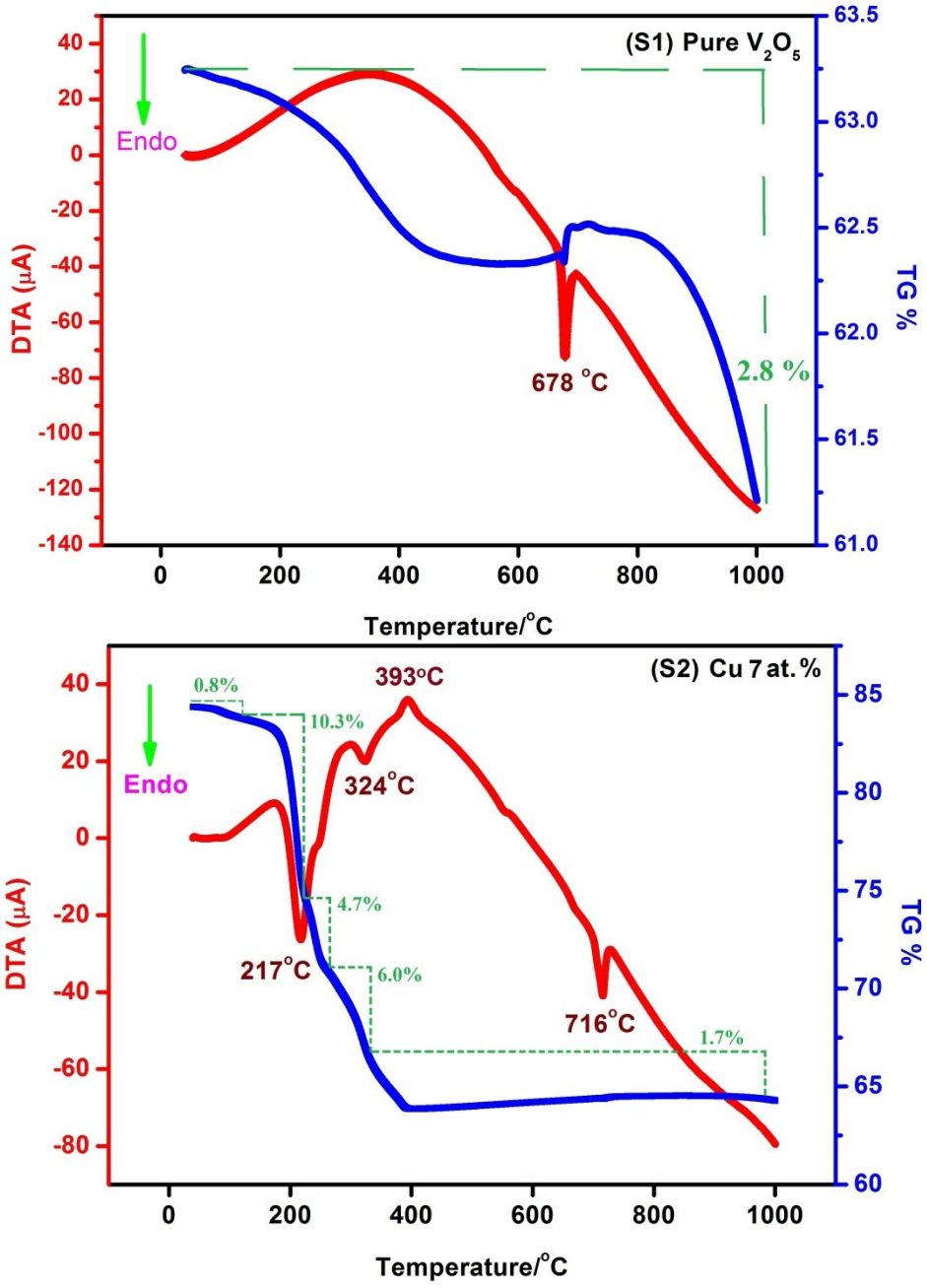

Fig. (S1) TG/DTA spectrum of Pure and **(S2)** Cu 7 at.% doped V_2O_5.

Reference

[1] Pavasupree, Y. Suzuki, A. Kitiyanan, S. Art, S. Yoshikawa, *J. Solid State Chem,*. 2005, **178,** 2152.