In_2O_3 Nanotowers and Nanochains

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Abstract— In_2O_3 nanotowers and nanochains have been prepared using the VLS (Vapor-Liquid-Solid) technique at the temperature of 900°C. The ingredients of the source material are In_2O_3 and active carbon. A thin layer of Au is deposited on the substrate using RF sputtering which acts as catalyst. The morphology and crystal structure of the nanotowers and nanochains are identified through X-ray diffraction (XRD), scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDX). Moreover, photoluminescence (PL) peak of In_2O_3 nanotowers and nanochains was observed as 370 nm at room temperature.

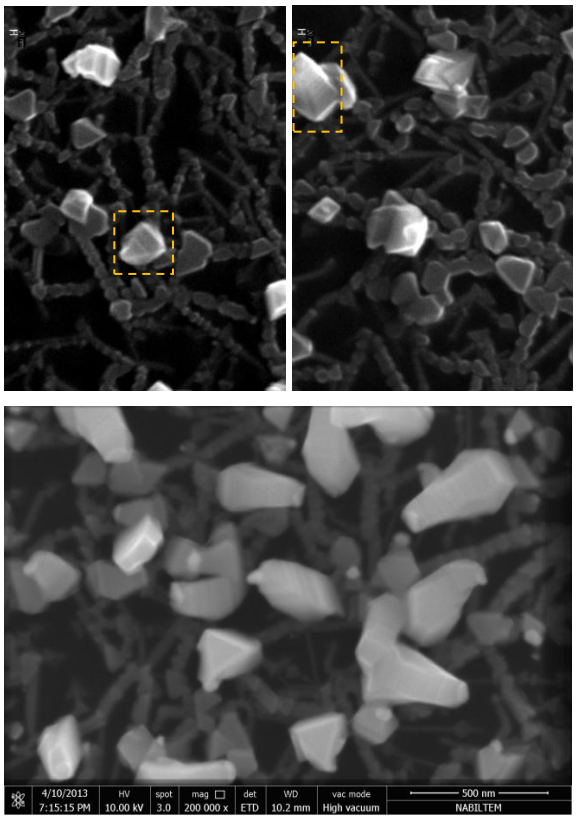


Figure-1: SEM images of In_2O_3 nanotowers and nanochains.

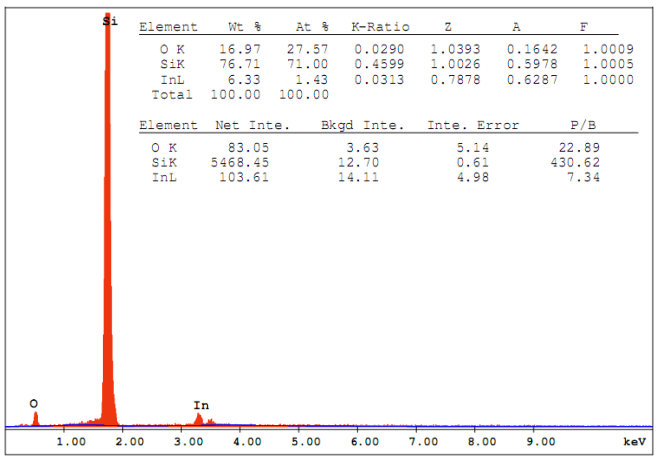


Figure-2: EDX measurement of as-synthesized In_2O_3 nanotowers and nanochains.

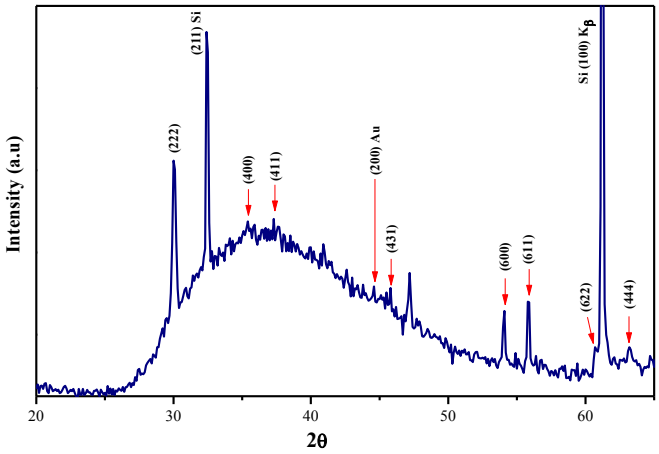


Figure-3: XRD spectra of In_2O_3 nanotowers and nanochains.

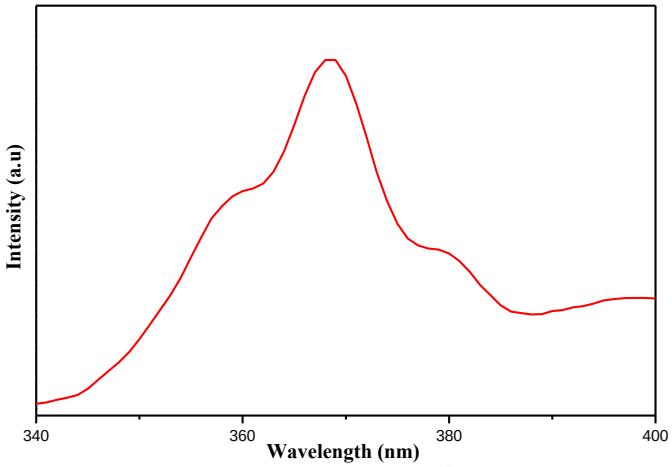


Figure-4: Photoluminescence (PL) spectrum of In_2O_3 nanotowers and nanochains at room temperature.

SEM image of the products (Fig. 1) shows that In_2O_3 nanotowers and nanochains were formed highly efficiently. The compositional purity of In_2O_3 nanotowers and nanochains were verified using EDX. A typical EDX spectrum is attached to Fig. 2 which shows that the individual nanotowers and nanochains consist of In and O. Fig. 3 indicates the X-ray diffraction patterns of as-grown In_2O_3 nanotowers and nanochains. Fig. 4 shows a strong and broad peak in the PL emission spectrum due to the In_2O_3 nanotowers and nanochains. The peak is mainly located in the UV emission region and its value is 370 nm (3.35 eV) at room temperature. Photoluminescence (PL) emission peak is commonly referred to as the deep level or trap state emissions due to oxygen deficiencies.

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