Title: Synthesis and Characterization of Ni doped SnO2 Nanofilms by Ultrasonic Spray Pyrolysis: PNP Photodegradation Application

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Abstract: Tin oxide (SnO2) nanofilms with varying concentrations of nickel (Ni) doping were fabricated on glass substrates using the ultrasonic spray pyrolysis method. Ethanol and tin (IV) chloride dehydrate served as precursors to prepare the nanofilms at deposition temperature of 450°C. X-ray diffraction (XRD) analysis confirmed that both pure and Ni-doped SnO2 nanofilms exhibited a tetragonal crystal structure. The surface morphology of the films was characterized by a dense, homogeneous, and continuous layer formed by nanometer-sized grains, with surface roughness varying depending on the doping level, as observed through Atomic Force Microscopy (AFM). Optical analysis via UV-Visible spectra showed that the nanofilms had high transparency and similar energy bandgap values. Finally, the nanofilms were tested in a photocatalysis experiment in aqueous solutions of p-nitrophenol (PNP) under UV light exposure. The results indicated that all the SnO2 films demonstrated significant photocatalytic activity under low UV light energy, with the Ni-doped films showing a marked improvement in photodegradation efficiency.

Keywords: SnO2, nanofilms, Ni doping, Photocatalysis

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