BOOK OF ABSTRACT

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Title: Photocatalytic activity of Ag doped TiO_2 nanocomposites.

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Abstract: Titanium (IV) oxide has attracted significant research attention in the field of material science in the last couple of years due to its unique and promising photocatalytic activity especially in the area of wastewater purification and destruction of microbes in water. Despite these useful functions, there are some associated technical hurdles that limit its widespread applications such as relatively high band gap energy, high electron-hole recombination rate and the post separation from wastewater after treatment. In order to overcome these challenges, it imperative to synthesis a novel stable plasmonic assisted semiconductor catalytic materials with enhanced photocatalytic activity for organic decomposition in water. In this study, TiO2 photocatalysts supported on a stainless steel mesh was synthesized via the sol-gel techniques. This was subsequently followed by post deposition of different thickness of metallic silver using a thermal evaporator technique. The synthesized catalysts were characterized with several analytical methods such as High Resolution Scanning Electron Microscope (HRSEM), High Resolution Transmission Electron Microscope (HRTEM), X-ray Diffraction (XRD)), Energy Dispersive X-ray Spectroscopy (EDX), Ultra-violet Vis (UV-Vis) spectroscopy and Fourier Transform Infrared Spectroscopy (FTIR). The photocatalytic activity of the synthesized catalysts was conducted under ultra-violet light irradiation (278 nm) using methylene blue as a model pollutant. It was discovered that TiO_2 surface modified with Ag resulted in a higher photocatalytic activity than undoped TiO_2 nanoparticles. The increase photocatalytic activity was ascribed to the plasmonic field effect of Ag which reduces the electron-hole recombination rate and ultimately increases the surface hydroxyl radicals.