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Indium oxide nanoparticles (In2O3 NPs) - 2

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Indium oxide nanoparticles (In2O3 NPs) is being studied for a variety of applications including gas-sensing, environmental remediation, and biomedicine. It is aimed to examine the effect of silver (Ag) doping on the photocatalytic and anticancer activity of In2O3 NPs. The Ag-doped (2%, 4%, and 6wt%) In2O3 NPs were synthesized by the photo-deposition method. Prepared samples were characterized via X-ray diffraction (XRD), transmission electron microscopy (TEM), scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS), Fourier transform infrared (FTIR), UV-vis spectrometer, and photoluminescence (PL). XRD data showed that Ag-doping increases the crystallinity of In2O3 NPs. SEM and TEM images indicated that In2O3 NPs have a spherical shape with smooth surfaces, and Ag-doping increases the size without affecting the particle's morphology. XPS spectra showed the oxidation state and the presence of Ag in In2O3 NPs. Bandgap energy of In2O3 NPs decreases with increasing the concentration of Ag (3.41 eV-3.12 eV). The peak intensity of PL spectra of In2O3 NPs also reduces with the increment of Ag ions suggesting the hindrance of the recombination rate of e-/h+. The photocatalytic activity was measured by the degradation of RhB dye under UV irradiation. The degradation efficiency of Ag-doped (6%) In2O3 NPs was up to 92%. Biochemical data also indicated that Ag-doping enhances the anticancer performance of In2O3 NPs against human lung cancer cells (A549). Overall, this study demonstrated that Ag-doping enhances the photocatalytic activity and anticancer efficacy of In2O3 NPs. This study warrants further investigation of environmental and biomedical applications of Ag-In2O3 NPs.

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