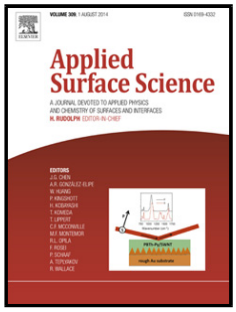

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Synthesis of Surface Plasmon Resonance (SPR) Triggered Ag/TiO_2 photocatalyst for degradation of Endocrine Disturbing Compounds

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Abstract

Surface deposition of silver nanoparticles (Ag NPs) onto the 100 % Anatase Titania (Ag/TiO_2) for evolution of Surface Plasmon Resonance (SPR) was achieved sustainably with the assistance of solar energy. The preparation resulted in Ag/TiO_2 photocatalyst with varied Ag depositions (0.5wt%, 1.0wt%, 3.0wt% and 5.0wt%). All obtained photocatalysts were characterized for the evolution of SPR via crystalline phase analysis, morphology, lattice fringes, surface area and pore size characteristics, chemical composition with chemical and electronic state, Raman scattering, optical and photoluminescence properties. The deposition of synthesized Ag NPs exhibited high uniformity and homogeneity and laid pathway for effective utilization of the visible region of electromagnetic spectrum through SPR. The depositions also lead for suppressing recombination rates of electron-hole. The photocatalytic evaluation was carried out by adopting two different class of Endocrine Disturbing Compound (EDC) i.e., amoxicillin (pharmaceutical) and 2, 4-dichlorophenol (pesticide) excited with artificial visible light source. Ag/TiO_2 with Ag > 0.5wt% exhibited significant degradation efficiency for both amoxicillin and 2, 4-dichlorophenol. Thus synthesized Ag/TiO_2 revealed the implication of plasmonics on TiO_2 for the enhanced visible light photocatalytic activity.

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