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Synthesis and Characterization of AgX/Ag_2MoO_4 Heterostructures with Enhanced Visible Light Activity and Improved Stability

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ABSTRACT

AgX/Ag_2MoO_4 were synthesized by a solvothermal approach and were implemented as visible light driven photocatalysts for the degradation of di-azo dyes under visible light irradiation. The as synthesized samples were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), Transmission electron microscopy (TEM), UV–vis diffuse reflectance spectroscopy (DRS), FTIR, N_2 adsorption-desorption isotherms (BET) and Florescence technique. The synthesized samples showed enhanced visible light absorption and displayed exceptionally high photocatalytic activity towards the degradation of di-azo dyes. The superior photocatalytic activity of heterostructures was attributed to the migration of electron-hole pairs across the heterojunction interface.. In order to find the mechanistic pathway involved in the degradation of dyes, different quenchers were used to trap the radicals produced during photocatalytic oxidation process of dyes. The cyclic runs were also carried out to determine the stability of as prepared heterostructures. The as-synthesized samples showed great stability and did not show any significant loss of activity even after 5 cyclic runs.

Keywords: composites, Congo red, heterostructure, photocatalytic Oxidation, Ponceau BS (PBS), solvothermal