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EFFECTIVE REMOVAL OF RHODAMINE B DYE FROM AQUEOUS SOLUTION BY ADSORPTION ON α - Ag_2WO_4 /SBA-15 NANOMATERIAL

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Abstract

Silver tungstate (α - Ag_2WO_4), sieve molecular mesoporous (SBA-15), and α - Ag_2WO_4 /SBA-15 x% (x is mass ratio of 5, 10, and 20% of α - Ag_2WO_4 to SBA-15) were synthesized by sonochemical, hydrothermal, and post-synthesis methods, respectively. The materials were characterized by powder X-ray diffractometry (XRD), field emission electron microscopy (SEM), N_2 adsorption/desorption, X-ray photoelectron spectroscopy (XPS), and zeta potential. The characterizations verify that silver tungstate (α - Ag_2WO_4) and nanocomposite α - Ag_2WO_4 /SBA-15 x% were obtained. The performance of α - Ag_2WO_4 /SBA-15 x% in adsorption of Rhodamine B (RhB) depended on percentage of α - Ag_2WO_4 . The RhB adsorption behavior onto adsorbents was well fitted to pseudo-second order kinetics and Langmuir isotherm model. The removal efficiency of α - Ag_2WO_4 /SBA-15 20% (1.050 g L^{-1}) was 100% for RhB 50 ppm at 30 min. Moreover, 80% of RhB was recuperated from adsorbents at neutral pH.

Keywords: adsorbent, molecular sieve, wastewater treatment

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