Preparation of adsorbents from sludges for adsorption of dye solutions

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ABSTRACT

he objectives of the research are to prepare the adsorbents using waste sludge as the raw material, and to study the adsorption behaviors of the single, binary, and ternary dyestuff solutions. Four single (AR4, AR27, MG, and RB5), two binary dyestuff solutions (MG+AR27 and RB5+AR4) and one ternary dyestuff solution (AR4+RB5+MG) were investigated. As for the chemical activation techniques applied to the waste sludge, the adsorbents using ZnCl2+H2SO4 as the activation agent was found to exhibit the greatest adsorption capability. The results showed that the adsorption of binary dye solutions could be well described by the rate equation of pseudo-second-order reaction. The saturated adsorption amount of RB5 in the binary dye solution is 22.32 mg/g, which is smaller than that in the single dye solution. As for the adsorption isotherms, the Langmuir adsorption isotherm could successfully describe most conditions. Based on the parameters derived from the adsorption of single dye solution, the isothermal adsorption equations of binary dye solutions could be predicted. Key word：Waste sludge, Chemical activation techniques, Kinetic equation, Adsorption isotherm, Dye

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