Adsorption of Binary Dye Solutions onto the Adsorbent Prepared from Waste Sludge by the Chemical Activation Technique

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ABSTRACT

The objectives of the research are to prepare the adsorbents using waste sludge as the raw material, and using different chemical activation techniques. The adsorption behavior on the removal of single and binary dyestuff solutions was studied and compare with the results of commercial GAC. Four single (AR4, AR27, MG, and RB5) and two binary dyestuff solutions (MG+AR27 and RB5+AR4) were investigated.

Among three chemical activation techniques, the adsorbents using ZnCl2+H2SO4 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. As for the adsorption isotherms, the Langmuir adsorption isotherm could successfully describe most conditions. Based on the data from the adsorption of single dye solution, the p-factor analysis was also applied to predict the adsorption capacity of binary dye solutions.

Keywords : Waste sludge、 Chemical activation techniques、 Kinetic equation、 Langmuir adsorption isotherm、 Dye

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