



Removal of RRD 120 Textile Dye from Industrial Wastewater Using Silica-Based Mesoporous Material

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Abstract

The aim of this study is the investigation of the adsorption conditions of Reactive RED 120 textile dye (RR120Td) on silica-based porous material. In a sustainable environment, chemical dyes, especially in industrial wastewaters (IWw), threats environment and human health significantly. In this work, it was investigated that RR120Td in textile wastewater can be removed by the adsorption method and the harmful effects of discharged wastewater to the environment can be reduced. These dyes used in industrial textile are the products which have a negative impact on life. Silica-based mesoporous materials (SbMMs) are used for the adsorption of dyes due to its narrow pore size distributions, high thermal stability, and larger surface areas. Furthermore, they have industrial applications such as catalysts and sorption. In this work, the synthesis of SbMM was first carried out by the hydrothermal method (HMt). The calcination of the material was then carried out at 550 °C for 6 hours. Characterization studies of the obtained SbMMs (calcined-uncalcined) were also determined by X-ray diffraction (XRD), scanning electron microscope (SEM), Brunauer-Emmert-Teller (BET) and zeta potential (ZETA) methods. The optimization studies were conducted by adsorption of RR120 textile dye with SbMM. Finally, the amount of adsorbent, pH, the effect of the time, and start concentration of dye were investigated.

Keywords: hydrothermal method; industrial waste water; RR120Td; silica-based mesoporous materials; waste water treatment