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REMOVAL OF METHYL ORANGE AND CADMIUM FROM SOLUTION USING MODIFIED ACTIVATED CHARCOAL

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Abstract

In this work, the removal of methyl orange (MO) and Cd^{2+} by simultaneous adsorption on adsorbent obtained from modified charcoal (BCBH) coated with TiO_2 has been studied. The synthesized materials obtained from wood branches were characterized using atomic force microscopy (AFM) for the roughness and SEM to determine the morphology of the surface. EDX spectroscopy indicates the presence of C, N, O, Na, K, P and Ti on the surface of the adsorbent materials. The micro-porosity and BET specific surface were carried out by N_2 adsorption. Additionally, the FT-IR spectroscopy illustrates that hydroxyl, carboxyl groups developed on the adsorbent surface are able to adsorb MO and Cd^{2+}. The effect of the experimental conditions on the adsorption behavior was studied by varying the contact time, amount of adsorbent and initial MO concentration. The adsorption data were modeled using the Langmuir and Freundlich adsorption isotherms equations. The kinetic studies showed that the adsorption followed pseudo-second-order kinetic model. The maximum adsorption capacity (q_{max}) was found to be 5.06 mg/g MO for the adsorbent in hydrothermal activated with NaOH. In case of adsorption from bicomponent systems under mechanical stirring the q_{max} for MO was 5.1 mg/g and for Cd^{2+} cations was 294.11 mg/g for BCBHD1 adsorbent.

Key words: adsorption, cadmium, hydrothermal charcoal, methyl-orange

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