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Study of malachite green adsorption onto natural zeolite in a fixed-bed column

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ABSTRACT

Natural zeolite was used as adsorbent for adsorption of malachite green (MG) from an aqueous solution in a fixed-bed column. The effect of different conditions, such as coexistent salt, flow rate, bed depth and influent dye concentration were studied. The results showed that coexistent salt did not favor adsorption. Adsorption reached saturation faster with increasing the flow rate and influent MG concentration while it was the advantage of column adsorption with the increase in the zeolite bed. The data were fitted to the Thomas model and Yan model by nonlinear regressive analysis. When the flow rate was 9 ml·min^{-1} and the influent concentration of MG was 50 mg·L^{-1}, the maximum adsorption quantity reached 23.55 mg·g^{-1} according to the Thomas model. The Yan model was better than the Thomas model to predict the column adsorption process. Zeolite can be used to remove cationic dye from solution.

Keywords: Natural zoelite; Malachite green; Column adsorption; Yan model

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