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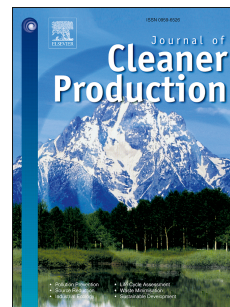
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Aluminium-modified activated carbon as efficient adsorbent for cleaning of cationic dye in wastewater

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Abstract

Facile and efficient adsorbent was prepared by modification of the activated carbon (AC) with aluminium (Al). Impregnation of commercial AC with varying weight per cents (1, 2, 5 and 10 %) of Al, using aluminium nitrate solution, resulted to AC-Al of differing Al-loading amounts and the composites were investigated for their sorption capacity of methylene blue (MB) in aqueous phase. Adsorbent characteristics with respect to cationic dye (MB) adsorption efficiency was studied by N₂-physisorption, Raman spectroscopy, FTIR and Boehm titration. The AC-Al (2) adsorbent containing 2 wt. % Al loaded on AC yielded the best performance due to better acidic and basic properties, with little compromise on surface area. Parametric investigation indicated a fast sorption process which is endothermic in nature. The Langmuir isotherm well described the adsorption process with a maximum adsorption capacity of 181.82 mg/g. The kinetic studies showed that the adsorption process followed a pseudo-second order kinetics. The

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