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DOI: 10.2478/auoc-2024-0014

Ovidius University Annals of Chemistry Volume 35, Number 2, pp. 105 - 110, 2024

Zinc chloride-activated Denim waste carbon for methylene blue removal

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Abstract. The aim of this work was to evaluate the adsorptive properties of denim-based activated carbon for methylene blue removal from water. The adsorbent was prepared through $ZnCl_2$ activation and characterized for specific area, surface chemistry and morphology. The batch adsorption was carried out at different dye concentrations, contact times and solution temperatures. The activated carbon, AC-$ZnCl_2$, yields a high surface area of 1323 m^2/g with adsorption capacity of 326 mg/g. The adsorption data were well-fitted into Langmuir and pseudo-second-order kinetic models. The adsorption is endothermic and spontaneous at high temperature. Also, the kinetic and thermodynamic studies show that the adsorption is governed by physical and chemical adsorption.

***Keywords*:** activated carbon; adsorption; denim waste; $ZnCl_2$ activation; methylene blue.

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