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Removal of Cadmium (II) from Aqueous Solution by Graphene Oxid

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Abstract. Heavy metal ions are one of the principal contamination source and cause of difficulties in wastewater processing that requires being eliminated before discharging into the eco-system. Adsorption of cadmium (II) from an aqueous solution by graphene oxide has been considered. Recently, graphene oxide (GO) has taken a large amount of attention because of high mechanical strength and appropriate surface area that has provided to apply as strengthened materials, various oxygen functional groups on its surface and π-electron system. In this investigation, graphene oxide was employed as an effective and proper adsorbent for separating the cadmium (II) from aqueous solution. TEM, Raman, FT-IR, and SEM tests have been used for characterizing the graphene oxide. In the adsorption process, initial concentrations of aqueous solution examined from 20 to 100 mg/l; pH and contact time were investigated from 3 to 8 and 5 to 100 minutes respectively. Adsorption isotherm obeyed Langmuir, Freundlich, and Temkin that the maximum cadmium adsorption capacity has been taken from Langmuir fitting with 135.14 mg/g. Also, the kinetic considerations explained that the adsorption manner followed the pseudo-second-order kinetic model with R^2. Thermodynamic investigations and parameters show the exothermic and spontaneous of adsorption.

Keywords: Graphene Oxide, Adsorption, Wastewater, Cadmium, Aqueous Solution