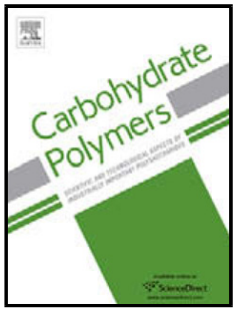

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Microwave preparation of triethylenetetramine modified graphene oxide/chitosan composite for adsorption of Cr(VI)

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Highlights:

- Triethylenetetramine modified graphene oxide/chitosan composite was prepared.
- Conventional and microwave preparations were used and compared.
- Adsorption of Cr(VI) on the composite was systematically studied.
- The product prepared by microwave has higher yield and uptake.
- The composite can removed the Cr(VI) in solution and reused.

Abstract: A novel triethylenetetramine modified graphene oxide/chitosan composite (TGOCS) was successfully synthesized by microwave irradiation (MW) method and compared with one prepared by conventional heating. This composite was characterized by FTIR, XRD, SEM, BET and elemental analysis. Adsorption of Cr(VI) on the composite was studied. The experimental results indicated that the product obtained by MW had higher yield and uptake than one obtained by the conventional and uptake of TGOCS for Cr(VI) was higher than that of the recently reported adsorbents. The effects of various variables on adsorption of Cr(VI) by TGOCS were further researched. The highest adsorption capacity of 219.5 mg g^{-1} was obtained at pH 2. Adsorption followed pseudo-second-order kinetic model and Langmuir isotherm. The capacity increased as increasing temperature. The adsorbent could be recyclable. These results have important implications for the application expansion of microwave preparation and the design of new effective composites for Cr(VI) removal in effluents.