



Removal of 2,4,6-trinitrotoluene from wastewater using a novel adsorbent polyvinyl alcohol/SiO₂

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Received 21 January 2013; Accepted 24 May 2013

ABSTRACT

2,4,6-Trinitrotoluene (TNT) is toxic and mutagenic to many living organisms, so more and more rigorous limits on the letting amount of TNT have been established. In this paper, monomer vinyl acetate (VAc) is grafted step by step on the surface of silica gel particles, and the grafted particle PVAc/SiO₂ is formed. Then, the novel adsorbent polyvinyl alcohol (PVA)/SiO₂ possessing strong adsorption ability for TNT is obtained through the alcoholysis reaction of PVAc. The grafted particles PVAc/SiO₂ and PVA/SiO₂ are characterized by Fourier transform infrared (FTIR) and thermogravimetric analysis (TGA). The adsorption performance of PVA/SiO₂ toward 2,4,6-trinitrotoluene (TNT) is investigated through static methods. The experimental results show that PVA/SiO₂ possesses strong adsorption ability for TNT with adsorption amount of 18.21 mg g⁻¹. The empirical Freundlich isotherm is also found to agree well with the equilibrium adsorption data. In addition, pH is found to have great influence on the adsorption amount. Finally, PVA/SiO₂ is found to have excellent reusability.

Keywords: Vinyl acetate; Polyvinyl alcohol; Adsorption; 2,4,6-trinitrotoluene (TNT)

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