

## Adsorption of Cerium as One of the Rare Earth Elements Using Multiwall Carbon Nanotubes from Aqueous Solution: Modeling, Equilibrium and Kinetics

**Authors :** Saeb Ahmadi, Mohsen Vafaie Sefti, Mohammad Mahdi Shadman, Ebrahim Tangestani

**Abstract :** Carbon nanotube has shown great potential for the removal of various inorganic and organic components due to properties such as large surface area and high adsorption capacity. Central composite design is widely used method for determining optimal conditions. Also due to the economic reasons and wide application, the rare earth elements are important components. The analyses of cerium (Ce(III)) adsorption as one of the Rare Earth Elements (REEs) adsorption on Multiwall Carbon Nanotubes (MWCNTs) have been studied. The optimization process was performed using Response Surface Methodology (RSM). The optimum amount conditions were pH of 4.5, initial Ce (III) concentration of 90 mg/l and MWCNTs dosage of 80 mg. Under this condition, the optimum adsorption percentage of Ce (III) was obtained about 96%. Next, at the obtained optimum conditions the kinetic and isotherm studied and result showed the pseudo-second order and Langmuir isotherm are more fitted with experimental data than other models.

**Keywords :** cerium, rare earth element, MWCNTs, adsorption, optimization

**Conference Title :** ICWTTS 2018 : International Conference on Waste Treatment Technologies and Systems

**Conference Location :** Dublin, Ireland

**Conference Dates :** July 23-24, 2018