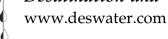
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Synthesis and characterization of functionalized polyacrylonitrile coated with iron oxide nanoparticles and its applicability in nitrate removal from aqueous solution

Ramin Nabizadeh<sup>a,b</sup>, Mahsa Jahangiri-Rad<sup>c,\*</sup>, Masoud Yunesian<sup>a,b</sup>, Jafar Nouri<sup>c</sup>, Faramarz Moattar<sup>c</sup>, Sodeh Sadjadi<sup>d</sup>

<sup>a</sup>Center for Water Quality Research, Institute for Environmental Research, Tehran University of Medical Sciences, Tehran, Iran <sup>b</sup>Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran <sup>c</sup>Department of Environmental Sciences, Graduate School of the Environment and Energy, Tehran Science and Research Branch, Islamic Azad University, Tehran, Iran

Tel. +9821 4486 9443; email: mahsajahangiri\_64@yahoo.com

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## **ABSTRACT**

A novel adsorbent, Polyacrylonitrile (PAN)-oxime-nano-Fe<sub>2</sub>O<sub>3</sub>, was developed to remove nitrates from water. The properties of the adsorbent were characterized by transmission electron microscopy, X-ray diffraction, and Fourier transform infrared spectroscopy. Experiments were carried out to investigate the adsorption kinetics and desorption behaviour of the adsorbent. The Langmuir, Freundlich, and Dubinin–Radushkevich (D–R) isotherms were determined and the results revealed that the adsorption was well explained by the (D–R) model. The experimental data fitted very well the pseudo-second-order kinetic model. Intra-particle diffusion affects nitrate uptake. The experiments showed that the maximum amount of nitrate released after desorption processes was about 50%, indicating that a large portion of nitrate was irreversibly retained by the PAN-oxime-nano-Fe<sub>2</sub>O<sub>3</sub>.

Keywords: Polyacrylonitrile; Nano-Fe<sub>2</sub>O<sub>3</sub>; Adsorption isotherms; Kinetics

\*Corresponding author.

<sup>&</sup>lt;sup>d</sup>Nuclear Science and Technology Research Institute, Nuclear fuel cycle school, Tehran, Iran