

Nitrate Removal from Drinking Water Using Modified Natural Nanozeolite

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Abstract : Nitrate compounds are considered as groundwater contaminants, the concentration of which has been growing in these resources during recent years. As a result, it seems necessary to use effective methods to remove nitrate from water and wastewater. Adsorption process is generally considered more economical in water treatment. Natural clinoptilolite zeolite is one of the best adsorbents because of its high capacity and low cost. In this research, we are going to modify zeolite nanoparticles as a chemical modification. Zeolite nanoparticles have been modified with a kind of organosilane, like 3-aminopropyltriethoxysilane. The advantage of this modification method, in comparison with physical modification, is the good stability in various environmental conditions. In this research, adsorbent properties have been analyzed by PSA, FTIR and CHN elemental analysis. Also, nitrate adsorption by modified nanoparticles was examined by UV-Vis spectroscopy. There would be NH_2 groups on the zeolite surface as a result of organosilane modification. In order to adsorption of nitrate, we need to convert NH_2 groups to NH_4^+ , that it is possible in acidic condition. As a result, the best nitrate removal is possible in the lowest concentration and pH. We obtained 80.12% nitrate removal in $\text{pH}=3$ and 50 mg/l nitrate concentration and 4 g/l adsorbent optimum concentration.

Keywords : nitrate removal, zeolite, surface modification, organosilane

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