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SILVER DOPED NATURAL AND SYNTHETIC ZEOLITES FOR REMOVAL OF HUMIC ACID FROM WATER

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Abstract

The purpose of the present work was to study comparatively the sorption of humic acids from water on Ag doped natural and synthetic zeolite envisaging the advanced drinking water treatment. Synthetic zeolite ZA nanoparticles were synthesized from natural clinoptilolite as Si source and sodium aluminate as Al source. The silver doped natural and synthetic zeolites were characterized by instrumental analysis methods, *i.e.*, X-ray diffraction (XRD), scanning electron microscopy (SEM/EDX) and FT-IR spectroscopy.

The equilibrium adsorption studies for humic acid allowed to assess the sorption capacity of the each zeolite, described by the adsorption isotherms, which informs about the surface properties and affinity of the material for the investigated pollutant. Langmuir, Freundlich and Dubinin-Radushkevich (D-R) adsorption isotherms were used to determine the equilibrium constants for the adsorption of the humic acid on the zeolite for various conditions, *e.g.*, humic acid concentrations and zeolite amount. Also, adsorption kinetics has been studied in terms of pseudo-first-order and pseudo-second-order to elucidate some sorption mechanistic aspects. All determined equilibrium and kinetic parameters showed that silver doped synthetic zeolite exhibited better adsorptive affinity and capacity for humic acid removal from aqueous solutions, in comparison with the silver doped natural zeolite.

Key words: adsorption, humic acid, natural zeolite, silver, synthetic zeolite

Received: September, 2011; Revised final: February, 2012; Accepted: March, 2012

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