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Elimination and Kinetics of Ammonium Ions from Waste Water Using by Zeolite (NaY) Preparing from Agriculture Waste

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Abstract

Zeolite NaY prepared by ash from rice husk used for elimination of ammonium from aqueous solutions. Its performance investigation was compared with natural zeolite granulated formed and powdered mordenite. Natural zeolite mordenite and prepared Zeolite NaY were characterized by Energy Dispersive X-ray (EDX), X-ray Diffraction (XRD) and total cation exchange capacity (CEC) was measured. Measured cation exchange capacity (CEC) of zeolite NaY was 3.15 meq g⁻¹, powdered mordenite was 1.46 meq g⁻¹ and granular mordenite 1.34 meq g⁻¹. Kinetics of adsorption and for the deletion of NH₄⁺ ions of equilibrium data from aqueous solutions were examined by fitting the investigational data to various models of reaction order. NH₄⁺ adsorption on zeolite NaY and mordenite powder followed Pseudo-second-order reaction kinetically. Compared to all isotherms equations, the equilibrium pattern fits well to the Langmuir isotherm equation. The adsorption capacity of the monolayer for powdered mordenite 14.99 mg g⁻¹ and granular mordenite 13.56 mg g⁻¹ to be very lower than that zeolite Y was found 43.25 mg g⁻¹. Compared to natural mordenite, it can be concluded that zeolite Y synthesized from ash husk is a better sorbent for ammonia removal from aqueous solutions predicted to its higher adsorption capacity and rapid adsorption rate.

Keywords

Author Keywords: zeolite Y; ammonium ions; mordenite; waste water
KeyWords Plus: NITROGEN REMOVAL; NATURAL ZEOLITE; MANURE; FEASIBILITY

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