

Parameters Affecting the Removal of Copper and Cobalt from Aqueous Solution onto Clinoptilolite by Ion-Exchange Process

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Abstract : Ion exchange is one of the methods used to remove heavy metal such as copper and cobalt from wastewaters. Parameters affecting the ion-exchange of copper and cobalt aqueous solutions using clinoptilolite are the objectives of this study. Synthetic solutions were prepared with the concentration of 0.02M, 0.06M and 0.1M. The cobalt solution was maintained to 0.02M while varying the copper solution to the above stated concentrations. The clinoptilolite was activated with HCl and H₂SO₄ for removal efficiency. The pHs of the solutions were found to be acidic hence enhancing the copper and cobalt removal. The natural clinoptilolite performance was also found to be lower compared to the HCl and H₂SO₄ activated one for the copper removal ranging from 68% to 78% of Cu²⁺ uptake with the natural clinoptilolite to 66% to 51% with HCl and H₂SO₄ respectively. It was found that the activated clinoptilolite removed more copper and cobalt than the natural one and found that the electronegativity of the metal plays a role in the metal removal and the clinoptilolite selectivity.

Keywords : clinoptilolite, cobalt and copper, ion-exchange, mass dosage, pH

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