

커피찌꺼기를 이용한 니켈함유폐수 흡착처리에 관한 기초연구

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A feasibility study has been conducted regarding the application of waste coffee grounds as an adsorbent for the treatment of nickel ion containing wastewater. The specific surface area of coffee grounds used in the experiment was found to be ca. 39.67 m²/g, which suggesting its potential applicability as an adsorbent due to its relatively high surface area. In the experimental conditions, more than 90% of the initial amount of nickel ion was shown to adsorb within 15 minutes and equilibrium in adsorption was attained after 3 hours. The adsorption behavior of nickel ion was well explained by Freundlich model and kinetics study showed that the adsorption reaction was second-order. Adsorption was reduced with temperature and its change of enthalpy in standard state was estimated to be -807.05 kJ/mol. Arrhenius equation was employed for the calculation of the activation energy of adsorption and nickel ion was observed to adsorb on coffee grounds exoentropically based on thermodynamic estimations. As pH rose, the adsorption of nickel ion was diminished presumably due to the formation of cuboidal complex with hydroxide ion and the coexistence of cadmium ion was found the decrease the amount of nickel ion adsorption.