Faculty of Science
Chemistry Department

Sorption Studies of Some Radionuclides Using Natural Clays

Thesis Presented By

Ahmed Mahmoud Elewa Abd El-Gawad

B.Sc. in Chemistry, 2011

Nuclear Chemistry Department – Hot Laboratories Center – Atomic Energy Authority

Submitted To

Chemistry Department, Faculty of Science, Ain Shams University

In
Partial Fulfillment of the Requirement for the Degree of Master of Science (Chemistry)

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Supervised By

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Removal of radiocobalt from aqueous solutions by adsorption onto low-cost adsorbents

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Abstract Four clays (bentonite, montmorillonite, diatomite and sepiolite) were used as low-cost adsorbents for removal of Co(II) radionuclides. The effect of the solution pH was studied in the range 1.5–10. The kinetic data were analyzed by the pseudo-first-order, the pseudo-second-order and intraparticle diffusion models. The equilibrium isotherms of Co(II) were analyzed by Langmuir and Freundlich models. The thermodynamic parameters (ΔG^o, ΔH^o and ΔS^o) were calculated and the results showed that

[1]. From the health point of view, it is necessary to remove Co(II) radionuclides from radioactive wastewaters before their discharge into the environment. Chemical precipitation, membrane separation, evaporation, solvent extraction, flotation, coagulation/flocculation and adsorption are the traditional methods used for treatment of radioactive liquid waste [2–7]. Among these methods, adsorption technique is the most effective method for removal of metal ions from aqueous solutions owing to its low cost as well as simplicity

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