



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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*Ahmed Mahmoud Elewa*







## 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 ( $\Delta G^\circ$ ,  $\Delta H^\circ$  and  $\Delta S^\circ$ ) 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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