

**EG0700303**

**8th ARAB INTERNATIONAL CONFERENCE ON  
POLYMER SCIENCE & TECHNOLOGY  
27 – 30 November 2005, Cairo-Sharm El-Shiekh, EGYPT**

**Modelling the Sorption Kinetics of Co and Eu Ions from Aqueous  
Solutions Using Cerium Tungstate Powder**

*A. A. El-Kamash, B. El-Gammal, A. A. Elsayed*

*Hot Laboratory Center, Atomic Energy Authority, P.O. 13759, Cairo, Egypt*

A cerium tungstate was chemically synthesized and characterized using X-Ray Diffraction (XRD), X-Ray Fluorescence (XRF), and thermal analysis. The sorptive removal of cobalt and europium ions from aqueous waste solution using synthetic cerium tungstate A was investigated. Experiments were carried out as a function of pH, solute concentration and temperature (298-333 K). Analysis of the respective rate data in accordance with three kinetic models revealed that the intraparticle diffusion was the rate limiting step for the sorption of both studied ions. Values of the pseudo first- order and pseudo second- order rate constants and the particle diffusion coefficients were determined from the graphical representation of the proposed models. Activation energy and thermodynamic parameters of free energy ( $\Delta G^*$ ), enthalpy ( $\Delta H^*$ ) and entropy ( $\Delta S^*$ ) of activation for each sorption process were calculated from the linearized form of Arrhenius equation. The results indicated that cerium tungstate can be used as an efficient material for the removal of europium and cobalt ions from waste solutions.