

Effect of aqueous acetic, oxalic and carbonic acids on the adsorption of americium onto α -alumina

Cyrille Alliot, Lionel Bion, Florence Mercier, Pierre Vitorge, Pierre Toulhoat
CEA DEN Saclay DPC/SECR & CNRS UMR 8587

The prediction of the migration for radionuclides in geologic media requires a quantitative knowledge of retardation phenomena. For this purpose, the sorption of Am(III) onto a model mineral — α -alumina — is studied here, including the effects of groundwater chemistry: pH and concentrations of small organic ligands (acetate, oxalate and carbonate anions). This work presents some experimental evidences for the synergic sorption mechanism of americium–ligand cationic complexes onto the alumina. As its anionic complexes were not sorbed, Am(III) cations were desorbed as a result of the formation of anionic complexes in the aqueous phase. By using the ion-exchange theory, and a corresponding restricted set of parameters —exchange capacities and thermodynamic equilibrium constants— the whole set of sorption experiments of Am(III) cationic species onto the α -alumina was modelled in various chemical conditions.