ACTINIDE CHEMISTRY IN AQUEOUS SOLUTIONS FOR WASTE DISPOSAL AND ENVIRONMENTAL STUDIES.

Pierre Vitorge[1,2], Catherine Beaucaire[2], Colin Marsden[3], Michael Descostes[2], Hélène Capdevila[4], Dominique You[2], Patrick Lovera[2]. (1) UMR 8587 Université d'Evry-CNRS-CEA[2].pierre.vitorge(at)cea.fr. (2) CEA DEN Saclay DPC/SECR, F91191 Gif sur Yvette cedex, France. (3) LPQ IRSAMC Université Paul Sabatier, 118 route de Narbonne, F31062 Toulouse cedex 4, France. (4) CEA DEN Cadarache DTCD/SPDE ,13108 Saint-Paul-lez-Durance cedex, France.

Mass Action Law is used for interpreting Aqueous Speciation in Stripa groundwaters, and in laboratory. A mechanism is proposed for Pyrite (FeS_2) dissolution. Activity coefficients are calculated with the SIT formula in up to 4 $mol.kg^{-1}$ auqeous solution; its empirical ion pair coefficients often vary as 1/T. Surface complexation and SIT formulas are compared. e^-, the notation of electrochemists is linked to Standard State. Thermodynamics of Solid Solutions and associated Ion Exchange Equilibria are discussed. Thermodynamic stabilities of $PuO_{2+x}(s)$ compounds are estimated. $PuO_2(s)$ solubility product was measured, despite Pu^{4+} disproportionates in aqueous solutions. UO_2^{2+} hydrolysed species were ab initio calculated.