Solubility of $Nd(OH)_3$ at High pH

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Experiments were carried out to determine the solubility of $Nd(OH)_3$, a non-radioactive analogue of $An(OH)_3$ (An = Pu^{3+}, Am^{3+}), at room temperature over pH (9 – 12) and ionic strength (0.2 – 4.0 m NaCl) intervals. Experiments were conducted in a glove box to preclude formation of carbonates. $Nd(OH)_3$ was synthesized using the method outlined by Wood et al. [1]. Solubility experiments were carried out in the undersaturation direction.

Concentrations of Nd were measured over the duration of the experiment (up to ~2 years). Fig. 1 is a plot of $\log_{10}$ Nd concentration versus pH for our experiments and those of previous investigators [1,2]. Two important points can be drawn from the data. First, the concentrations of Nd from our experiments form a continuum of data from those of previous investigations. Second, there appears to be no dependence of the solubility on solution pH over the pH interval 10 to 13. These data appear to exclude the possibility of a $Nd(OH)_4^-$ complex up to pH 13.

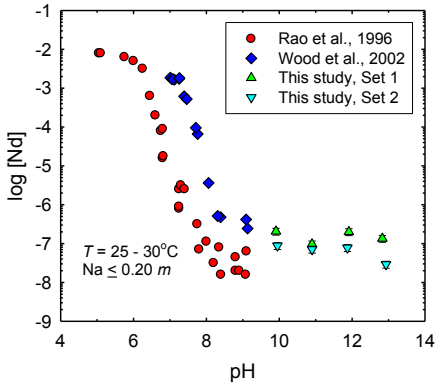

Figure 1. Plot of $\log_{10}$ Nd versus pH and data from [1,2].

[1] Wood, S. A., et al. (2002), pp. 229-256, *Water-Rock Interactions, Ore Deposits, and Environmental Geochemistry: A Tribute to David A. Crerar*, Washington, D. C. [2] Rao, L., Rai, D. and A. R. Felmy (1996). *Radiochim. Acta* **72**: 151-155. Sandia National Laboratories is a multi-mission laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.