

Experimental evidence for coffinite formation from UO_{2+x}

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In previous work [1,2] the synthesis of coffinite, has been investigated and its thermodynamic stability established. The key findings are that coffinite can form in anoxic conditions, at alkaline pH and in silica-rich solutions and that coffinite is metastable with respect $\text{UO}_2(\text{cr})$.

We have investigated the pathways for the formation of coffinite from UO_2 at alkaline pH, in the presence of silica-rich solutions under anoxic conditions. This has been done by a combination of solution chemistry, spectrophotometric and electron microbeam techniques (SEM and TEM). The results demonstrate that coffinite forms from UO_{2+x} at surface layers under these conditions.

1.Xiaofeng Guo et al (2015) Thermodynamics of formation of coffinite, USiO_4 . Proceedings of the National Academy of Sciences, vol. 112, 6551-6555, doi: 10.1073/pnas.1507441112.

2.Stephanie Szenknect, et al (2016) First experimental determination of the solubility constant of coffinite. Geochimica Cosmochimica Acta, vol. 181, 36 – 53.