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## Complexation of curium(III) with pyoverdinin-model compounds

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The aerobic groundwater bacterium *Pseudomonas fluorescens* (CCUG 32456) isolated from the aquifers at the Äspö Hard Rock Laboratory, Sweden secretes siderophores of the pyoverdinin-type. Besides iron(III), these unique bioligands are also able to form strong complexes with actinides (e.g., U(VI), Np(V), and Cm(III)) [1-3]. For U(VI) and Np(V) we could show that mainly the catechol and to less extend the hydroxamate functionalities of the pyoverdinin molecule are involved in the actinide coordination [1, 2]. For Cm(III) it is still not clear which functional group of the pyoverdinin molecule causes the great stability constants. In general, Cm(III) interactions with pyoverdinin-model compounds and especially with chromophore-models are poorly understood. To address this lack, we thus present findings regarding the speciation of Cm(III) with 2,3-dihydroxynaphthalene in aqueous solution by time-resolved laser-induced fluorescence spectroscopy (TRLFS) at trace Cm(III) concentrations (0.3  $\mu\text{M}$ ) over a wide pH range. TRLFS is a well established direct speciation technique for investigating the complexes formed by actinides in both geochemical and biochemical environments. Four Cm(III)- dihydroxynaphthalene species of the type  $\text{MxLyHz}$  could be identified from the spectroscopic measurements. The stability constants of these strong Cm(III)- bioligand complexes and their individual spectroscopic properties (excitation and emission spectra, lifetimes) are reported. TRLFS shows that Cm(III)- dihydroxynaphthalene species cause a strong red shift of the characteristic Cm(III) (aq) emission band at 593.8 to 614.4 nm. The findings of our Cm(III) speciation study in comparison with the literature indicate a stronger affinity of Cm(III) to the catechol functionality of the pyoverdinin molecules as found for U(VI) and Np(V).

[1] H. Moll, M. Glorius, G. Bernhard, A. Johnsson, K. Pedersen, M. Schäfer, H. Budzikiewicz, *Geomicrobiol. J.* 25, 157-166 (2008).

[2] H. Moll, M. Glorius, A. Johnsson, M. Schäfer, H. Budzikiewicz, K. Pedersen, G. Bernhard, *Radiochim. Acta*, submitted (2009).

[3] H. Moll, A. Johnsson, M. Schäfer, K. Pedersen, H. Budzikiewicz, G. Bernhard, *BioMetals* 21, 219-228 (2008).

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