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Publication Date

2007-05-09

LBNL-62681

This abstract was prepared for a presentation at "Actinide Chemistry" symposium at the American Chemical Society Northwest Regional Meeting to be held in Boise, ID, June, 17-20, 2007

Prepared: May 9, 2007

Actinide interaction processes with bacterial surfaces: The quest for molecular-level understanding.

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Microorganisms play an important role in the immobilization and mobilization of actinides in aquifers and subsurface environments.

This talk will present several detailed examples of the interaction of aerobic soil bacteria with uranium and plutonium. Details of the nature of the bacterial functional groups involved in the interfacial actinide interaction process will be reported. Based on time-resolved laser-induced fluorescence spectroscopy (TRLFS) and synchrotron X-ray absorption spectroscopy (XANES and EXAFS) studies, molecular-level mechanistic details of the different interaction processes will be discussed. Complexation studies on bacterial surface model compounds with curium will be reported. Areas of this emerging field in actinide research will be outlined where additional information and integrated interdisciplinary research is required.