

**SECTION A. Project Title: Interrogating f-element-ligand Interactions by X-ray Absorption Spectroscopy – Florida International University****SECTION B. Project Description**

Florida International University (FIU) proposes to investigate the nature of inner and outer coordination sphere bonding interactions present in f-element complexes of relevance to nuclear energy development. This is extended to include actinide complexes both in solution, and, at surfaces in a variety of oxidation states generated through chemical, or electrochemical means and spectroscopically characterized by multi-nuclear NMR, UV-vis, FT-IR, Raman, and x-ray absorption spectroscopy. In the development of new f-element complexes for separations, nuclear energy, and nuclear security research, understanding the nature of the interactions between actinides and ligands is of utmost importance in guiding future research direction to tune complex properties, including selectivity, solubility, spectroscopic characteristics, and redox state stability. The project will include the acquisition and utilization of 3 new pieces of equipment: a potentiostat, UV-vis-NIR spectrometer, and x-ray absorption spectrometry (XAS) spectrometer, all of which, along with associated computers, will be maintained within the radiological Permacon facility at FIU. FIU intends to provide access to these instruments to students and researchers within FIU, as well as external nuclear researchers and envisions that the XAS spectrometer would be included in DOE's Nuclear Science User Facilities (NSUF) list of capabilities, and that researchers from outside FIU would also have access.

**SECTION C. Environmental Aspects / Potential Sources of Impact**

The university has procedures in place to handle any waste that will be generated through this project. The action would not create additional environmental impacts above those already occurring at the university.

**SECTION D. Determine the Level of Environmental Review (or Documentation) and Reference(s): Identify the applicable categorical exclusion from 10 CFR 1021, Appendix B, give the appropriate justification, and the approval date.**

Note: For Categorical Exclusions (CXs) the proposed action must not: 1) threaten a violation of applicable statutory, regulatory, or permit requirements for environmental, safety, and health, including requirements of DOE orders; 2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities; 3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; 4) adversely affect environmentally sensitive resources. In addition, no extraordinary circumstances related to the proposal exist which would affect the significance of the action, and the action is not "connected" nor "related" (40 CFR 1508.25(a)(1) and (2), respectively) to other actions with potentially or cumulatively significant impacts.

References: B1.31 Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.

Justification: The activity consists of procuring and utilizing equipment to prepare and characterize solution and surface-bound actinide compounds in a variety of oxidation states by X-ray absorption spectroscopy.

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act)  Yes  No

Approved by Jason Anderson, DOE-ID NEPA Compliance Officer, on 07/23/2021.