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International Research Staff Exchange Scheme

HEXANE

Project title: **Heavy Elements X-ray Absorption Spectroscopies
Network**

Project number: **230807**

Project coordinator: **Commissariat a l'Energie Atomique, Paris, France**

FZD participant: **Institute of Radiochemistry**

Starting date: **01.01.2010**

Duration (months): **48**

Summary

The hexacyanometallate family is well known in transition metal chemistry because the remarkable electronic delocalization along the metal-cyano-metal bond can be tuned in order to design systems that undergo a controlled change of their physical properties. Heavy elements, and particularly f-transition elements, have a very rich chemistry and their behaviour is still a matter of debate.

Actinide elements are often compared to transition metal elements in the sense that their valence 5f orbitals are partially available for chemical bonding, in contrast with lanthanide elements that mainly form pure ionic bonds. Hexacyanometallate derivatives of heavy cations have been reported, although to a much smaller extent than transition metal derivatives.

The goal of this network is to develop a joint experimental and theoretical approach for the full characterization and interpretation of the intramolecular interactions in hexacyanometallate systems of heavy elements. This network will gather experimentalists and theoreticians from France, Germany, Mexico, Spain and the United States, all interested in structural and electronic X-ray absorption spectroscopies of heavy elements.

It will also involve three synchrotron facilities, two in Europe and one in the United States, giving access to a wide range of photon energies. The project will involve Master and PhD students and post-doctoral fellows, as well as young and experienced permanent staff from each team. It will reach a balance between exchanges among experimentalists and theoreticians and stays at the synchrotron facilities.