Ph.D. defense

Institut de Chimie Séparative de Marcoule / CEA Marcoule
(UMR 5257, CEA, CNRS, Université Montpellier, ENSCM)

ALEXANDRE ARTESE

will present his Ph.D. dissertation

Characterization of N, P ligands for uranium(VI) refining in nitric medium

The defense will take place on **Friday, October 11th, 2019** at **1.15 pm**

in the ICSM Auditorium

Refining plants of natural uranium concentrates use hydrometallurgical processes to produce uranium with a so-called "nuclear" purity. After dissolution in nitric acid to obtain an aqueous solution of uranium(VI), solvent extraction process is used to purify uranium. The commonly used extractant tri-n-butyl phosphate (or TBP) present however some drawbacks (accumulation of thorium, non-concentrating back-extraction, significant solubility in an aqueous phase).

The goal of the study is to explore the ability of new N, P bifunctional extractants for the selective extraction of uranium(VI) in nitric media, and to understand the mechanisms involved in the extraction of uranium(VI) as well as in the extraction of the competing element zirconium(IV).

Mechanisms underlying solvent extraction processes being not only based on the chelating properties of the extractant molecules, but also on their capacity to form supramolecular aggregates because of their amphiphilic nature, the extraction mechanisms were studied at both molecular and supramolecular scales.

Thanks to the understanding of the extraction mechanisms, the difference of separation factor U/Zr obtained with two amidophosphonates extractants which differ only in the presence of a central alkyl chain could be explained. It was shown that this difference is takes its origin in the ability of one of the extractants N, P to self-assemble and not in different affinities of the coordinating functions.

Keywords: Liquid-liquid extraction; uranium; bifunctional ligands; origin of selectivity