POLITÉCNICA

DEPARTAMENTO DE INGENIERÍA ENERGÉTICA

INDUSTRIALES ETSII | UPM

UNIVERSIDAD POLITÉCNICA DE MADRID
ESCUELA TÉCNICA SUPERIOR DE INGENIEROS INDUSTRIALES

Máster Universitario en *"Ciencia y Tecnología Nuclear"*

Master Erasmus Mundus SARENA (Safe and Reliable Nuclear Applications)

ADVANCED SEMINARS:

"Radiolytic effects affecting reprocessing of nuclear fuel performance"

Lecturer: Dr. Hitos Galán

Head of High Level Waste Unit (URRAA)
Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT)

PhD in Chemistry, University Autónoma of Madrid (UAM), 2008. Her particular expertise areas are the design, synthesis and optimization of lanthanides and actinides extraction systems, and in the last years particularly focused on the study of their resistance towards radiation. Dr. Galán has contributed to EURATOM projects dealing with advanced spent fuel reprocessing for the last 15 years (FP6 EUROPART, FP7 ACSEPT, FP7 SACSESS and H2020 GENIORS), being the scientific contact of CIEMAT since 2013, and work package leader of some projects since 2017. More than 40 contributions to national and international conferences and more than 20 papers in international scientific journals within JRC (Journal Citation Reports).

Abstract:

Closing the fuel cycle to promote sustainability of nuclear energy requires capabilities to reprocess and multi-recycle major (U, Pu) and minor actinides (MA: Am, Cm, Np) into fuels for advanced reactors. This strategy would significantly reduce the burden of HLW long-term management and optimize the utilization of a final deep geological repository; however, it involves the development and industrialization of separation processes able to isolate different families of radionuclides. The required chemical separations are achievable using either non-aqueous (pyrometallurgical) or aqueous (hydrometallurgical) processes, being the latter the most mature technology able to deal with actinides recycling. In fact, a successful process for separating uranium and plutonium (PUREX process) has successfully been applied at the industrial scale.

Many advanced separation processes based on liquid-liquid extraction have to date been proposed for major and minor actinide recovery. However, extraction systems are prone to degradation due the highly radiative field and nitric acid concentration where nuclear fuel is dissolved. This degradation gives place to changes in the physico-chemical properties mainly due to the formation of degradation products that may lead to undesirable effects such as a decrease of performance, third phase formation, etc. Therefore, to reach a high technological readiness level (TRL) for such processes depends not only on their good extraction abilities, but also on their hydrolytic and radiolytic stability and the capability to predict and optimize their behaviour in the long-term operation, since they will run in continued operation.

This seminar summaries the most important steps for a hydrometallurgical process development for advanced fuel cycles, paying special attention to all those fundamental aspects for an integral addressing of solvent resistance and their behaviour in the long-term.

Date and time: **Friday 13 May 2022 [10:00 – 12:00]**
Place: **Aula "Artigas"** de la ETSII

Con el patrocinio de la Cátedra de Seguridad Nuclear "Federico Goded"