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Chemistry for the Future Nuclear Fuel Cycles

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Actinide chemistry is at the centre of key issues to be faced by nuclear energy. Indeed, in addition to an increased safety of the reactors themselves, the acceptance of the nuclear energy is still closely associated to our capability to reduce the lifetime of the nuclear waste, to manage them safely in a long term disposal and to propose options for a better use of the natural resources. Before implementing a process at the industrial level, it is of primary importance to increase our fundamental knowledge in actinide sciences in terms of safety, fabrication and performance of fuels, reprocessing and long term waste management.

Among FP7-EURATOM Framework Program, a few projects work closely to address the challenges of future fuel cycles. Among them, SACSESS (Safety of ACTinide SEparation proceSSes) and TALISMAN work to improve our knowledge in actinides chemistry in order to develop advanced separation processes. SACSESS is focused on the development of safe advanced separation processes, both aqueous and pyrochemical. Head-end steps, fuel refabrication, solvent treatment, waste management are also taken into account.

TALISMAN (Transnational Access to Large Infrastructures for a Safe Management of ActiNides) gives European researchers the opportunity to come and work in unique facilities. By offering transnational access to the main European nuclear research facilities, TALISMAN aims at increasing the knowledge in actinide sciences by gathering all the expertise available in nuclear research institutes or university in Europe and giving them the opportunity to come and work in hot-labs or beamlines.

Exchanges and complementarities are also established with other Euratom initiative (ASGARD, CINCH-II...) to cover broadly the nuclear fuel cycle challenges.

In all projects, efforts have been made to increase collaborations, mutualize and homogenize procedures and share good practices. Training and education initiatives including seminars, workshops, brainstorming meeting but also student exchanges and support to post-doctorate fellowships is a key point for maintaining and increasing a high expertise level in actinide separation sciences in Europe.

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