



Speciation and uptake mechanisms of uranium in marine organisms

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Nuclear energy production is a high benefit - high risk energetic policy. If a high benefit is associated to the significant carbon free energy density of nuclear fuel compared to fossil fuels, a high risk is instead illustrated by nuclear accidents with consequent release of radionuclides in the environment. Such risk is amplified by the dual (chemical and radiological) toxicity of radionuclides, which makes their management critical in case of release in the environment. A noteworthy example is the Fukushima accident in 2011, which highlighted the urgent need to evaluate and predict the impact of radionuclides on marine ecosystems. For this purpose, the first necessary step is to decipher the chemical mechanisms of their interactions with the marine biotope.

The seminar will present the case study of uranium interaction with laboratory-assembled marine ecosystems. We will discuss the uptake of uranium (^{nat}U) by two model marine organisms, the sea urchin *P. lividus* and the seaweed *L. digitata*, within a multi-scale mechanistic perspective (macroscopic, cellular and molecular scale). Particular focus will be put on the complementary analytical and spectroscopic tools used to explore the kinetics of ^{nat}U transfer fluxes from seawater to organisms, its distribution in tissues and cells and its *in vivo* chemical speciation.