



**HAL**  
open science

## Chemical homologue speciation in natural systems: a key to understand the anthropogenic RN fate

Francis Claret, Catherine Lerouge, Sylvain Grangeon, Tom Sato, Thorsten Schäfer, Eric Giffaut, Christophe Tournassat

### ► To cite this version:

Francis Claret, Catherine Lerouge, Sylvain Grangeon, Tom Sato, Thorsten Schäfer, et al.. Chemical homologue speciation in natural systems: a key to understand the anthropogenic RN fate. Goldschmidt 2013, Aug 2013, Florence, Italy. hal-00811188

**HAL Id: hal-00811188**

**<https://hal-brgm.archives-ouvertes.fr/hal-00811188>**

Submitted on 10 Apr 2013

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Please ensure that your abstract fits into one column on one page and complies with the *Instructions to Authors* available from the Abstract Submission web page.

## **Chemical homologue speciation in natural systems: a key to understand the anthropogenic RN fate**

F. CLARET<sup>1</sup>, C. LEROUGE<sup>1</sup>, S. GRANGEON<sup>1</sup>, T. SATO<sup>2</sup>, T. SCHÄFER<sup>3</sup>, E. GIFFAUT<sup>4</sup> AND C. TOURNASSAT<sup>1</sup>

<sup>1</sup>BRGM, 3 avenue C. Guillemin, BP 36009, 45060 Orléans Cedex 2-France

<sup>2</sup>Laboratory of Environmental Geology, Hokkaido University Kita 13 Nishi 8, Sapporo 060-8628, Japan

<sup>3</sup>Institute for Nuclear Waste Disposal (INE), KIT Campus Nord, D-76021 Karlsruhe, Germany

<sup>4</sup>ANDRA, 1 rue Jean-monnet, Châtenay-Malabry 92298, France

Anthropogenic radionuclides (RN) are generated by a wide range of industrial, medical and military activities. In a context of storage in deep geological formations or after their release in terrestrial environments by accidents, it is of paramount importance to quantify their mobility, which is partly ruled by their interaction with the solid surfaces. Usually, experiments are conducted using radiotracers at various scale from laboratory to the field in order to measure retention and retardation parameters. Although this kind of experiment is fundamental to tackle this issue, understanding the natural speciation of stable isotopes as chemical homologues to RN brings useful additional information. In particular, it sheds light on RN isotopic exchange and “irreversible” trapping mechanisms. This approach has already been used successfully to gain a better comprehension of iodine fate in the far-field of geological disposals (Claret et al., 2010), which was debated in the literature, due to conflicting experimental results (from no retardation to significant retardation, depending on the study). By careful quantification of iodine reservoirs in the Callovian-Oxfordian clay rock, it was possible to provide new insights into this aspect of the iodine problem. The relevance of such approach for Sr (Lerouge et al., 2010), Se and Ni, three elements with contrasted chemical behaviours and of interest for radwaste storage will be discussed based on new experimental results.

Claret, F., et al., 2010. Natural iodine in a clay formation: Implications for iodine fate in geological disposals. *GCA* 74, 16-29.

Lerouge, C., et al. 2010. Strontium distribution and origins in a natural clayey formation (Callovian-Oxfordian, Paris Basin, France): A new sequential extraction procedure. *GCA* 74, 2926-2942.