



Contribution ID: 176

Type: Poster

Spectroscopic Studies of Complexation Behaviour of Uranium(VI) by Schiff Bases

Wednesday, 19 September 2012 18:00 (1h 50m)

Uranium can be released into the natural environment especially from mining areas by weathering, erosion and anthropogenic activities as well as by nuclear incidents and thus represents a hazard potential for humans. New supramolecular complexing agents with N, O, S donor function are developed for the use in nuclear field and environmental protection to separate the metals of the d- and f-block and thus to clean contaminated areas. An essential basic component of these new organic ligands are Schiff bases.

In this study the complexation of uranium(VI) with Schiff bases N-benzylideneaniline (NBA), 2-(2-hydroxybenzylideneamino)phenol (HBAP) and alpha-(4-hydroxyphenylimino)-p-cresol (HPIC) was investigated in alcoholic solution using the UV-vis spectroscopy and time-resolved laser fluorescence spectroscopy with ultrashort laser pulses (fs-TRLFS). Through the change of the absorption or emission properties of organic ligands can be observed the complexation with uranium(VI) and calculated corresponding complex formation constants.

The complexation of uranium(VI) with NBA was observed by a hypsochromic shift in the NBA band to 237 nm with the UV-vis spectroscopy. Investigations with the ligand HBAP show a bathochromic shift to 281 nm. The UV-vis absorption spectra of HPIC with uranium(VI) show no spectral shift, but a decrease in intensity of the double band at 283nm and 332 nm in comparison to the free ligand. All three ligands form complexes ML_x with more ligand molecules (x=2,3).

The fs-TRLFS as a sensitive speciation technique was used to determine the luminescence properties of formed complexes in the uranium(VI)-NBA, uranium(VI)-HBAP and uranium(VI)-HPIC systems. The emission signals had a hypsochromic, bathochromic and hypsochromic shift in comparison to the emission maxima of the uncomplexed ligand. This fs-TRLFS investigation opens up the possibilities for the determination of very short-lived complex species via the fluorescence of the organic compounds by delocalized π -electron systems.

Primary author: Ms LINDNER, Katja (Helmholtz-Zentrum Dresden-Rossendorf, Germany)

Co-authors: Mrs GÜNTHER, Alix (Helmholtz-Zentrum Dresden-Rossendorf); Mr BERNHARD, Gert (Helmholtz-Zentrum Dresden-Rossendorf)

Presenter: Ms LINDNER, Katja (Helmholtz-Zentrum Dresden-Rossendorf, Germany)

Session Classification: Poster Session

Track Classification: Radioactive elements in the environment, radiation archeometry and Health Physics