



	Experiment title: Investigations on the adsorption of organotin compounds on clays with high resolution X-ray fluorescence microscopy at the Sn absorption-edge	Experiment number: ME-318
Beamline:	Date of experiment: from: 21.9.2001 to: 27.9.2001	Date of report: 21.8.2002
Shifts:	Local contact(s): Dr. Ulrich Neuhäusler	<i>Received at ESRF:</i>
Names and affiliations of applicants (* indicates experimentalists): Dr. Claudia Schmidt, Institut für Röntgenphysik, Universität Göttingen, Geiststraße 11, D – 37073 Göttingen, Germany * Dr. Marion Hoch, Lehrstuhl für Angewandte Geologie, Universität Erlangen-Nürnberg, Schlossgarten 5, D – 91054 Erlangen, Germany * Dr. Ulrich Neuhäusler, ESRF, X-ray microscopy beamline ID 21, BP 220, F – 38043 Grenoble Cedex, France *		

Report:

Results acquired during this experiment were presented as a poster at the 7th International Conference on X-ray microscopy, 29.7.-2.8.2002, Grenoble, France

A publication will appear in the proceedings of this conference:

**U. Neuhäusler, C.Schmidt, M. Hoch, J. Susini:
“Fluorescence X-ray microscopy on hydrated organotin clay mineral suspensions”,
Proceedings of the 7th International conference on X-ray microscopy (XRM02, 29.7.-
2.8.2002), Journal de Physique IV, in press October 2002**

Abstract see next page.

Fluorescence X-ray microscopy on hydrated organotin-clay mineral suspensions

Ulrich Neuhäusler¹, Claudia Schmidt², Marion Hoch³, Jean Susini¹

¹ European Synchrotron Radiation Facility (ESRF), ID 21, BP 220, 38043 Grenoble Cedex, France

² Institut für Röntgenphysik, Georg-August-Universität, Geiststraße 11, 37073 Göttingen, Germany

³ Lehrstuhl für Angewandte Geologie, Universität Erlangen, 91054 Erlangen, Germany

Due to their widespread industrial application butyltin compounds have been introduced to various ecosystems. The persistence and distribution of butyltins in polluted aquatic systems is a function of physical, chemical and biological processes [1]. Systematic laboratory experiments, mainly restricted to the high toxic tributyltin (TBT), had shown that this compound is strongly adsorbed to clay minerals depending on pH values and salinity [2]. Because this is a reversible process, a better knowledge of the sorption behaviour of organotin compounds is required to assess the bioavailability and the ecological risk of these toxic contaminants in natural systems.

To reveal the spatial distribution of the butyltin on the clay mineral surface, fluorescence scanning X-ray microscopy has been done at ID21 of the ESRF on hydrated samples using the $L_{II/III}$ -absorption edges of tin at 4465, 4156 and 3929 eV. Using an incident beam with 4.5 keV photon energy and analyzing the emitted fluorescence radiation by an energy dispersive detector, Tin (and also Calcium as present in some minerals) can be mapped with sub-300 nm resolution [3].

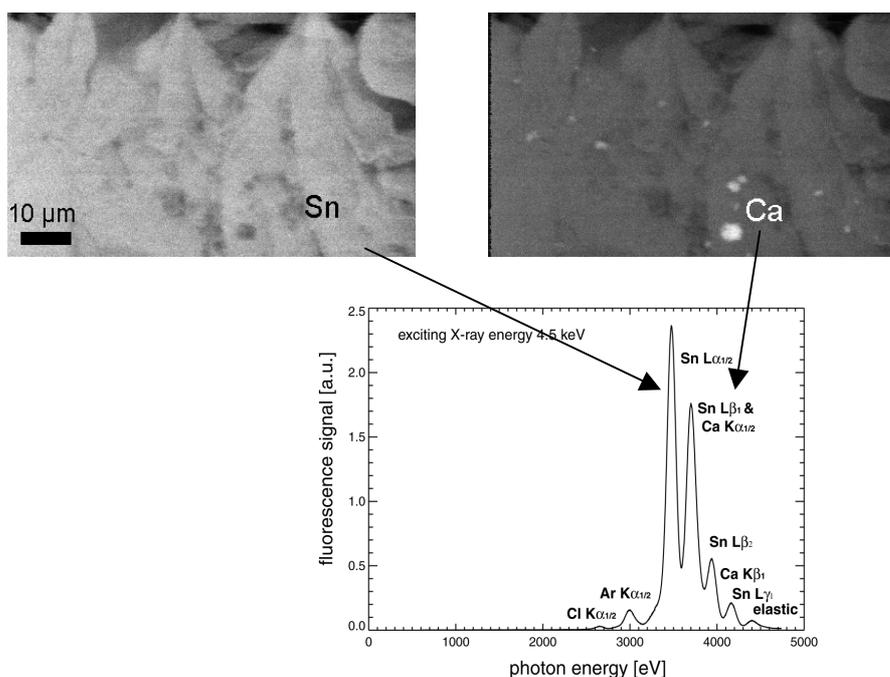


Figure 1: Fluorescence element maps of Sn & Ca in a hydrated tributyltin (1000 ppm) kaolinite-clay aqueous clay mineral suspension.

References

[1] Hoch M (2001) Organotin compounds in the environment – an overview. *Appl. Geochem.*, 16: 719-743.

[2] Hoch M, Alonso-Azcarate J, Lischick M (2002) Adsorption behavior of toxic tributyltin to clay-rich sediments on various environmental conditions. *Environ. Toxicol. Chem.*, 21 (in press).

[3] C. Schmidt et al., publication in preparation