

## The discovery of an independent thallium mineral (TII) in the Xiangquan thallium deposit in He county, Anhui Province, China

Y. FAN<sup>1\*</sup>, T.F. ZHOU<sup>1,2</sup> AND F. YUAN<sup>1</sup>

<sup>1</sup>School of Resources and Environment Engineering, Hefei University of Technology, P.R. China  
(\*correspondence: fan\_yu9@hotmail.com)

### Microprobe Analysis

Thallium (Tl) is a dispersed element that seldom occurs in the form of independent minerals, so it is hard to form an independent thallium deposit [1]. Xiangquan deposit is situated near the town of Xiangquan, 20 km north of He county, Anhui province, eastern China, which is the first example of a thallium-only deposit discovered in the world. The thallium element is highly enriched (up to 10000 ug/g) in the deposit and mostly hosted in pyrite [2]. Part of the thallium occurs as tiny individual thallium grains in tiny fractures and the rest is in the crystal lattice in pyrite. Microprobe analysis result of several tiny individual thallium grains show the molecular formula of those minerals should be TII.

### Discussions

The TII crystal is an artificially chemical combination which has not been found in the nature yet, the discovery of TII mineral in the Xiangquan deposit show that in special geology and geochemical condition, dispersed element thallium can combined with iodine to form rare independent thallium mineral. Further work will be done in the future.

This research was supported by the National Natural Science Foundation of China (40672062, 4083042 and 40803015) and Major State Basic Research Development Program of China(2007CB411405).

[1] Liu *et al.* (1984) Scientific Publishing House, Beijing, 392-399 (in chinese). [2] Zhou *et al.* (2005) *Mineralogy and Petrology* **85**, 243-251.

## XANES investigation of the redox behavior of Cr in a tropical context

D. FANDEUR<sup>1\*</sup>, F. JUILLOT<sup>1</sup>, G. MORIN<sup>1</sup>,  
S. WEBB<sup>2</sup>, L. OLIVI<sup>3</sup>, J.L. HAZEMANN<sup>4</sup>,  
G.E. BROWN<sup>2,5</sup> AND E. FRITSCH<sup>1</sup>

<sup>1</sup>IMPMC, UMR CNRS 7590, Univ. P6-P7-IPGP, Paris, France

<sup>2</sup>SSRL, SLAC, Menlo Park, California 94025, USA

<sup>3</sup>ELETTRA, Area Science Park, 34012 Basovizza, Italy

<sup>4</sup>Institut Néel, Université J. Fourier, ESRF/FAME, Grenoble, France

<sup>5</sup>Stanford university, Stanford, California 94025, USA

New-Caledonian lateritic soils developed on ultramafic rocks present Cr concentrations up to 3wt% [1]. These large amounts of Cr can cause serious risks for the environment, especially regarding the large toxicity and solubility of Cr(VI) compared to Cr(III). Actual assessment of the environmental quality of New-Caledonian lateritic soils then relies on our capacity at characterizing Cr speciation and behavior in these systems.

A bulk XANES investigation along a 64m depth weathering profile showed a very good spatial correlation between Cr(VI) and Mn(III-IV) oxides [2]. These results strongly suggest an oxidation of Cr(III) to Cr(VI) by Mn-oxides, as already demonstrated in laboratory studies [3,4]. In addition, spatially-resolved XANES data suggests that, after oxidation, Cr(VI) is desorbed from Mn-oxides and trapped by surrounding Fe-oxides [5]. This supposed oxidation/sorption behavior for Cr has been confirmed by XANES data on synthetic samples obtained after reacting dissolved Cr(III) with mixtures of synthetic Mn- or Fe-oxides [5].

This work was supported by the French ANR-ECCO program.

[1] Fandeur *et al.* (2009) *Am. Mineralogist*, in press.  
[2] Fandeur *et al.* (2009) *ES&T*, submitted. [3] Fendorf (1995) *Geoderma* **67**, 55-71. [4] Manceau & Charlet. (1992) *JCIS* **431**, 425-441. [5] Fandeur *et al.* (2009) *GCA*, submitted.