The Clay Minerals Society

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2019 CMS PROFESSIONAL AWARD RECIPIENTS SPOTLIGHT

Dr. Bruno Lanson

The 2019 **George W. Brindley Clay Science Lecture** was awarded to Dr. Bruno Lanson at the 56th Annual Meeting of the Clay Minerals Society, which was held July 2019 as part of the larger Euroclay conference in Paris (France). Bruno obtained his PhD in 1990 and is now a senior researcher at ISTerre (Earth Science Institute, CNRS, Grenoble Alpes University, France). His research focuses on the crystal chemistry of finely divided lamellar minerals/materials in relation to their surface reactivity. Bruno uses detailed X-ray diffraction analysis, plus a variety of other diffraction and spectroscopic techniques, to define the nature of the structural defects that influence mineral reactivity.

Bruno Lanson has applied his approach to minerals/materials from many different environments: in mineral transformations that affect clay minerals in sedimentary series, in engineered clay barriers in the context of waste repositories, and in forest or agricultural soils where clays interact with plants. He is also interested in the structural characterization of lamellar manganese oxides, for which he has determined the structure of several varieties that have exhibited a low density of structural defects and the structure of analogous cryptocrystalline and defective species resulting from biological activity. Bruno has also unraveled the structural mechanisms of how trace metals and phyllomanganate surfaces interact and the structural features and reaction mechanisms that are responsible for phyllomanganates transforming to tunnel structures.

Bruno Lanson previously received the 2006 European Mineralogical Union's Research Excellence Medal. He is a Fellow of the Mineralogical Society of America and the next President of the Clay Minerals Society.

Dr. Laurent Michot

Dr. Laurent J. Michot was chosen to give the **2019 Pioneer in Clay Science Lecture**, which recognizes research contributions that have led to important new directions in clay minerals science and technology. Laurent Michot received his PhD in Earth sciences in Nancy (France) for work on the surface chemistry of talc and chlorite (supervisor Jean Cases). After a post-doc at Michigan State University (USA) in Tom Pinnavaia's chemistry laboratory, where he worked on clays pillared by organo-inorganic species, Laurent Michot joined the French National Centre for Scientific Research (CNRS) in Nancy in 1991. In 1999, he took a one year sabbatical at the University in Melbourne (Australia) before returning to Nancy. He moved to Paris in 2013 to join the PHENIX (Physicochimie des Electrolytes et Nanosystèmes Interfaciaux) laboratory: in 2019, he was appointed the head of this laboratory. His research interests cover the crystal chemistry and colloidal properties of clay minerals, the analysis of surface heterogeneity at solid/gas and solid/liquid interfaces, the phase behavior of swelling clay minerals and the link with rheological properties, and the structure and dynamics of confined water. Laurent is an intensive user of large-scale facilities, including synchrotrons and neutron reactors, and has used a wide spectrum of experimental techniques (scattering, diffraction, spectroscopy, imaging) to better understand the physical chemistry of minerals, but mainly clays.

STUDENT RESEARCH SPOTLIGHT

Ying Li

Congratulations to Ying Li from the Guangzhou Institute of Geochemistry of the Chinese Academy of Sciences (China) and the University of Illinois at Urbana–Champaign (USA) for winning the 2019 CMS Student Research Grant! Ying Li studies the **effect of isomorphous substitution on the reducing capability of magnetite coupled with aqueous Fe^{2+}**. In anoxic environments, the interaction between magnetite and aqueous Fe^{2+} enhances contaminant reduction. Because iron ions in natural magnetite can be substituted by other cations, it is important to know how the substitution, for example with thermodynamically favorable redox pairs like Co(II)/Co(III), plays a role in the reducing capability of the coupled system. In this study, both the reaction kinetics and electron transfer amount illustrate that Co substitution ($Fe_{3-x}Co_xO_4$, $x \leq 0.77$) generally promoted the reduction activity of the coupled system, while an overdose of Co ($x > 0.77$) retarded the process. During the redox reaction, the adsorbed Fe^{2+} and structural Fe(II) of $Fe_{3-x}Co_xO_4$ were gradually oxidized, while $Fe_{3-x}Co_xO_4$ maintained its spinel structure; 2-chloronitrobenzene was completely reduced to 2-chloroaniline; Cr(III) was precipitated on the $Fe_{3-x}Co_xO_4$ surface with Fe(III), or substituted for octahedral Fe in $Fe_{3-x}Co_xO_4$. The promotion effect of Co substitution was ascribed to the presence of the redox pairs Co(II)/Co(III) and Fe(II)/Fe(III) in octahedral sites, which accelerated electron transfer among Fe^{2+}, $Fe_{3-x}Co_xO_4$, and contaminants. These results shed light on the role of magnetite-group minerals and their impact on the fate of contaminants in anoxic environments.

ANNUAL MEETING

Student Research and Travel Grant Deadline is 24 February 2020.

CMS MEMBERSHIP RENEWAL

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