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Société Française de Minéralogie et de Cristallographie

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The Society thanks outgoing councilors Pierre Barbey, Olivier Grasset, Jean-Louis Hazemann, Gérard Panczer, Gian Carlo Parodi and Jacques Roux for four years of dedicated service.

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The *European Journal of Mineralogy* on GEOSCIENCEWORLD

The *European Journal of Mineralogy*, the journal of SFMC (France), DMG (Germany), SIMP (Italy) and SEM (Spain), joined GeoScienceWorld and can be accessed at

http://eurjmin.geoscienceworld.org

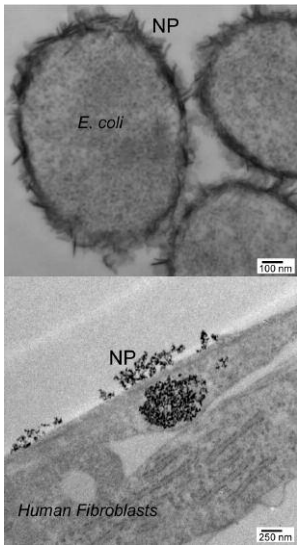
For all SFMC and FFG joint activities visit the web site
http://e.geologie.free.fr

PRIX HAÜY-LACROIX 2008

The Prix Haüy-Lacroix recognizes a young scientist for the quality of his or her PhD research in the fields of mineralogy, petrology, geochemistry, or materials science. This year it was awarded to Mélanie Auffan, on 10 June 2008 during the SFMC 2008 general assembly in Paris.

Mélanie Auffan obtained her PhD from the Paul Cézanne University at the CEREGE (Aix-en-Provence) with a thesis entitled "Metal Oxide Nanoparticles: Relations between Surface Reactivity and Biological Effects." Jean-Yves Bottero and Jérôme Rose were her advisors. A summary of her work follows.

Nanotechnology as a branch of engineering deals with producing objects approximately 1–100 nm in size. Activities spawned by nanomaterials will affect the social, economic, and environmental dimensions in ways that are unanticipated. Along with the benefits provided by nanomaterials (e.g. medical sciences and environmental protection), there are potential adverse effects that need to be considered. The high level of production fueled by growing markets for products incorporating these materials will inevitably lead to their appearance in air, water, soils, and organisms. It would be naïve to imagine that this emerging industry will not leave unforeseen traces in our environment. Research is needed to ensure that this industry evolves in a context of environmental sustainability and not as an environmental liability.



TEM photomicrographs of human dermal cells internalizing nano-CeO_2 and nano-Fe° adsorbed on the membrane of *Escherichia coli*

Nanoparticles (NP) cannot be considered as typical chemical compounds or particles. They have a high surface/volume ratio: more than ~35% of the atoms are localized at the surface of a 6 nm NP. This high ratio generates unique extrinsic (large specific surface area) and intrinsic (strong surface reactivity) properties for very small NP. NP smaller than 20 nm are able to react differently than bulk materials. For instance, iron oxide particles between 300 and 20 nm in size adsorb similar amounts of arsenic per unit of surface area (~6 mmol/m^2), suggesting similar adsorption mechanisms. But the adsorption capacity of NP smaller than 20 nm increases drastically: 11 nm iron oxide NP adsorb 3 times more As per unit area (~18 mmol/m^2) than do 20 nm iron oxide particles (e.g. Yean et al., *J. Matter Res.* 2005). These results highlight different adsorption mechanisms at the surface of very small NP and a true nano-size effect. For the first time, we have related this enhanced adsorption to a significant decrease of the surface free energy and to size-dependent change of the crystalline structure of the surface. For instance, as the size decreases, the occupancy of the tetrahedral site of γ-Fe_2O_3 decreases, leaving vacant highly reactive sites at the surface, which are available to adsorb As. For larger γ-Fe_2O_3 particles, all tetrahedral sites are occupied, which decreases the number of possible adsorption sites. This structural change allows the adsorption of a large amount of As at the surface and induces a significant decrease of the surface energy. Hence, whereas in macroscopic systems adsorption is mainly governed by chemical affinity and electrostatic strength, for NP smaller than 20 nm, the decrease of the surface free energy is a supplementary driving force.

Below a critical size, it is not possible to simply scale the physicochemical, thermodynamic, and toxicological data for bulk materials and thus predict the biological activity of NP. A number of studies have suggested that some NP can cause adverse biological effects. But a serious lack of characterization of the NP tested makes it difficult to identify which key characteristics determine the hazard documented in nanotoxicological

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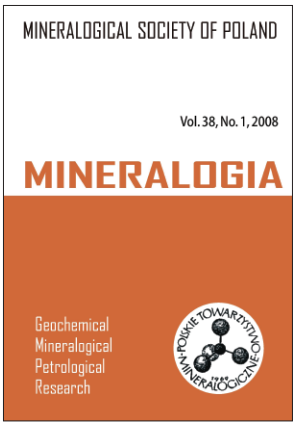
Mineralogical Society of Poland

MINERALOGIA POLONICA JOURNAL CHANGES ITS TITLE AND COVER



Mineralogia Polonica, the official journal of the Mineralogical Society of Poland, was founded in 1970. Two issues have been printed every year to date. *Mineralogia Polonica*, publishing in English from its beginning, has been very important for the development of mineralogical science in Poland. Based on a long discussion with our foreign contributors and other colleagues from abroad, we have concluded that the title suggests that the journal is focused on local mineralogical problems in Poland. To avoid this misunderstanding, we decided to modify the title and, accordingly, the journal cover. The new and simple title *Mineralogia* (with subtitle *Geochemical, Mineralogical, and Petrological Research*) indicates the open character of the journal. Our intention is to publish original papers, review papers, and short notes from the broad fields of geochemistry; mineralogy; petrology; technical, experimental and applied mineralogy; and environmental geochemistry and mineralogy. We also decided to introduce changes in the review and preparation of papers to ensure a high scientific level and a relatively short time span between paper submission and publication (electronic and paper versions). The regular series *Mineralogia* will be accompanied by the irregular one (*Mineralogia – Special Papers*), containing conference abstracts.

It is our deep conviction that the journal published by our scientific society should be accessible freely to the whole scientific community. Similarly to the former *Mineralogia Polonica*, all full-text papers in the new journal will be accessible via the society website (www.ptmin.agh.edu.pl), Direct Open Access Journals (www.doaj.org), Metapress (www.metapress.com), and via the *Mineralogia* webpage (www.mineralogia.pl).

We invite you to publish your papers in *Mineralogia*, and we hope you will like the experience.

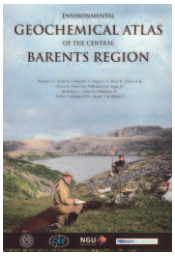
Marek Michalik
President of the Mineralogical Society of Poland

4th MID-EUROPEAN CLAY CONFERENCE MECC'08

Zakopane, Poland
22–27 September 2008
www.mecc08.agh.edu.pl
e-mail:mecc08@agh.edu.pl

IAGC (cont'd from page 268)

Special Offer for IAGC Members: 10 Years of the Kola Project



In 1998, the Geological Survey of Norway (NGU) published the now-classic *Environmental Geochemical Atlas of the Central Barents Region* or, in short, *The Kola Atlas*. The atlas presents the results of an international (Finland–Norway–Russia) multimedia (terrestrial moss, topsoil and the O-, B- and C-horizon of podzol profiles), multi-element (more than 60 chemical elements, radioisotopes and other parameters), geochemical mapping project, covering 188,000 km^2 in the European Arctic. IAGC members who do not yet have the atlas in their library can now get it free of charge, provided they pay the postage (the book weighs 2.5 kg). The official sales price of the book is 450 NOK, about US$90. The NGU still sells about one copy every three months or so but wants to reduce the stock substantially. Orders should be sent to Clemens.Reimann@ngu.no.

START-UP MEETING FOR EUROPEAN-SCALE GEOCHEMICAL MAPPING PROJECT

The EuroGeoSurveys Geochemistry Working Group met in Berlin, March 5–7, 2008. At this meeting the GEMAS Project (Geochemical Mapping of Agricultural Land and Grazing Land Soils of Europe) was officially started. Thirty-four European geological survey organizations have agreed to collect samples of arable land (ploughing layer, 0–20 cm) and of land under permanent grass cover (0–10 cm) at a density of 1 site per 2500 km^2 in their territory. The total area covered will be about 5.8 million km^2. The project is a continuation and extension of the Baltic Soil Survey, which resulted in a very successful geochemical atlas. The project is led by Clemens Reimann, IAGC Vice-President. The European metals industry, represented by EuroMetaux of Brussels, will support this project with a contribution of 130,000 Euros per year, over a four-year period.

Clemens Reimann

SFMC (cont'd from page 269)

PRIX HAÜY-LACROIX 2008

Mélanie Auffan receiving the Prix Haüy-Lacroix 2008 from Patrick Cordier, SFMC President

studies. Our goal was to develop appropriate methods to assess the safety of NP. Using a standardized bio-physicochemical approach controlling the properties of NP all along their interactions with biological targets, it is possible to compare toxicological data and to identify mechanisms of toxicity. We propose a classification of the potential toxicity of metallic NP related to a redox sensitivity that predisposes them to induce an oxidative stress towards biological targets. Indeed, chemically stable metallic NP in physiological redox conditions do not exhibit any cytotoxicity in our experimental conditions, whereas metallic NP with strong oxidative (e.g. CeO_2) or reductive (e.g. Fe° or Fe_3O_4) power appear cytotoxic for *Escherichia coli* and genotoxic for human fibroblasts. The main source of toxicity is the electronic and/or ionic transfers during oxidation (e.g. Fe^{2+} and/or Fe°) or reduction reactions (e.g. Ce^{4+}, Mn^{3+}, Co^{3+}) either within the NP lattice or on release to solution. These results raise many questions concerning the toxicity of nanometric crystallites. While this redox activity may be desirable for several applications (e.g. catalysis, sensors), we have pointed out that this same trait can also have negative implications in an environmental context.