

CERIC-ERIC newsletter n.4

CERIC-ERIC is an integrated multidisciplinary Research Infrastructure open for basic and applied users in the fields of Materials, Biomaterials and Nanotechnology. With a single entry point to excellent facilities, it allows structural investigation, analysis and synthesis of materials, using photon, electron, neutron, and ion based techniques.

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Results



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Highlights



Results

How nanoparticles give electrons away

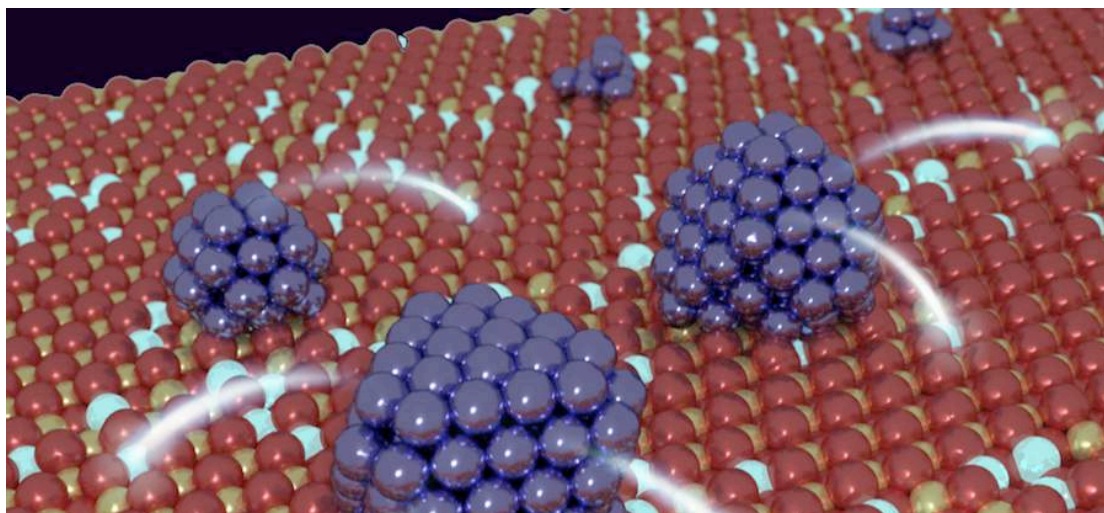
CERIC users gain new insights into the electrical charge of platinum particles

December 2015

Whether it is in catalytic processes in the chemical industry, environmental catalysis, new types of solar cells or new electronic components, nanoparticles are everywhere in modern production and environmental technologies, where their unique properties ensure efficiency and save resources. The special properties of nanoparticles often arise from a chemical interaction with the support material that they are placed on. Such interactions often change the electronic structure of the nanoparticle because electrical charge is exchanged between the particle and the support. The working groups led by Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) and the University of Barcelona (UBCN) have now succeeded in counting the number of

elementary charges that are lost by a platinum nanoparticle when it is placed onto a typical oxide support. Their work, realized thanks to the access obtained through CERIC-ERIC and being part of the FP7 project chipCAT coordinated by the Director of the Czech CERIC-ERIC Partner Facility, Prof. Vladimír Matolin, brings the possibility of developing tailor-made nanoparticles a step closer.

Nanoscience has long investigated how nanoparticles interact with the support that they are placed on. It is now clear that various physical and chemical factors such as the electronic structure, the nanostructure and – crucially – their interaction with the support, control the properties of nanoparticles. Nevertheless, previous studies have not investigated how much charge is transferred and whether there is a relationship between the transfer and the size of the nanoparticle.



Authors of graphics: Sergey Kozlov and Oriol Lamiel

In order to measure the electrical charge that is exchanged, the international team of researchers from Germany, Spain, Italy and the Czech Republic, led by Prof. Dr. Jörg Libuda and Prof. Dr. Konstantin Neyman, prepared an extremely clean and atomically well-defined oxide surface, onto which they placed platinum nanoparticles. Using a highly sensitive detection method at the Czech Materials Science beamline in Elettra Sincrotrone Trieste, accessed through the CERIC-ERIC call 1, the researchers were able to quantify the effect for the first time. Looking at particles with various numbers of atoms, they counted the electrons transferred and showed that the effect is most pronounced for small nanoparticles with around 50 atoms. The magnitude of the effect is surprisingly large: approximately every tenth metal atom loses an electron when the particle is in contact with the oxide. The work involved a combination of multiple experimental techniques including CERIC-ERIC access time at microscopy and spectroscopy instruments of the Surface Physics Laboratory in Prague. The researchers were also able to use theoretical methods to show how the effect can be controlled, allowing the chemical properties to be adapted to better suit their intended application. This would allow valuable raw materials and energy to be used more efficiently in catalytic processes.

Opportunities

CERIC Call for Proposals

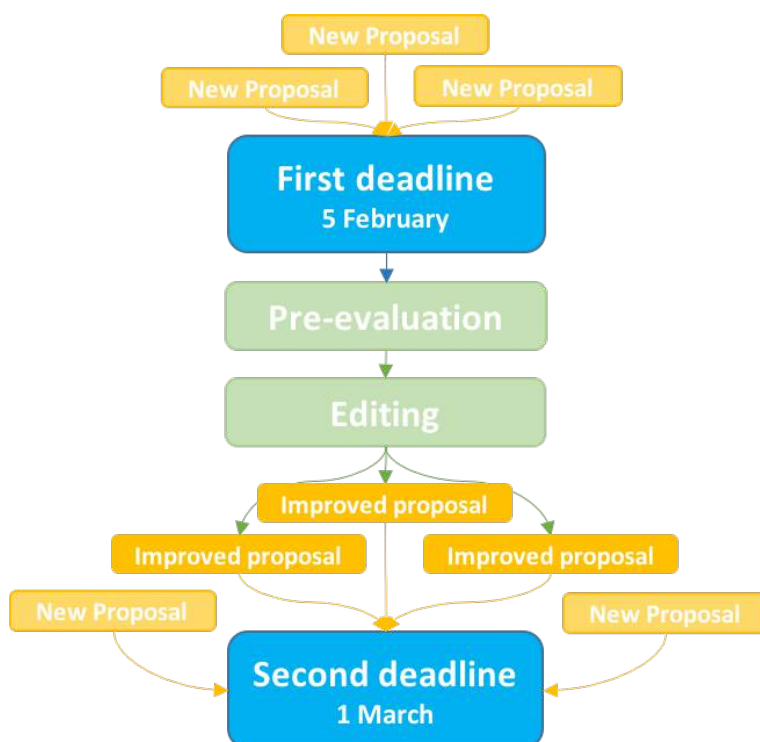
Deadline Step 1: February 5th, 2016 / Deadline Step 2: March 1st, 2016

January 2016

The fifth CERIC Call for Proposals will open in January 2016.

CERIC offers open access to two or more complementary facilities through one single proposal. Moreover, in the present call also single instrument proposals will be accepted for those facilities that do not have another channel of open access available, such as the NMR in Liubljana, the TEM and EPR in Magurele, Light and X-ray scattering facilities in Graz, the Surface Science laboratory in Prague and the Deep Lithography Synchrotron radiation beamline in Trieste.

Proposals should be submitted online through the Virtual Unified Office – VUO. There will be two deadlines: the first one – on February the 5th at 17:00 CET – will allow to have a pre-evaluation of the proposal from the staff of the facilities, including useful suggestions to improve the contents during the editing phase, before the definitive submission, scheduled on March the 1st at 17:00 CET. Expert users may decide to submit their proposals directly on the second deadline.



Access to CERIC is open to scientists from all over the world and is free of charge for academic and non-proprietary research. The only condition for free access is the evaluation by peer review of the proposal and open publication of the results of the experiments, with appropriate citing of the facilities and local contacts involved.

For more information visit the [CERIC-ERIC website](#) .

Events

CERIC @ the Italy-Serbia Day

The Italian Ambassador in Belgrade mentions CERIC as a milestone for Serbian strategic roadmap to European integration

November 16th 2015, Belgrade – Serbia

On November 16th 2015, the Italian Embassy in Belgrade organized the workshop *Italy-Serbia Day: Growth & Development through Science & Technology*, in connection with the Signature Ceremony of the bilateral “Executive Protocol for the scientific and technological cooperation 2016-2018”.

In his introductory speech, the Italian Ambassador in Belgrade, Giuseppe Manzo, explicitly quoted CERIC and declared: “EU Serbia Report 2015 contains two recommendations in the field of Science & Research: 1) to modernize the organization of research and innovation in line with the European Research Area; 2) to stimulate cooperation between industry and academia. Italian and Serbian cooperation in this regard goes straight towards these goals: we have been both founding Countries of CERIC. This fact brings Serbia even closer to the European Research Area and to its strategic objectives”.

CERIC-ERIC, which was invited to attend the workshop, was represented by Prof. Carlo Rizzuto (Chair of the General Assembly) and by Fabio Mazzolini (Deputy Director for EU and International Relations).

CERIC @ the OECD Meeting for Socio-Economic Impact of RIs

Models and synergies for conducting cost-benefit analysis and impact assessments of RIs.

November 3rd 2015, Paris – France



Prof. Helmut Schober, Munich University of Technology and FRMII, and CERIC Scientific Fellow, Matthias Girod, at the OECD meeting in Paris.

CERIC participated in the first meeting organized in Paris by the OECD to discuss the challenges that Research Infrastructures have to face in order to define a common model to measure their socio-economic impact. Representatives from both European and non-EU RIs presented the methodologies currently in use in their organizations and raised key questions about the quantity and typology of indicators to be used for

ex-ante and ex-post impact assessment. The discussions showed a variety of perspectives, grounded on the broad diversity of organizations (and therefore on the variability of their impact) and on the different background of the participants: science, economy and policy-making. Depending on the context, the importance of the amount of both the flexibility of the model and its indicators, is perceived differently. For example, whereas RIs managers see impact assessment as a tool for performance enhancement only, not questioning science itself, economists state that the impact of science should always be measured and taken into account. Despite the wide variety of perspectives, one main point gave a common ground for agreement: funding institutions, decision-makers and RIs managers have different needs for socio-economic impact assessments. Identifying those needs is a prerequisite before defining agreed and shared indicators for impacts. Clearly, specific indicators would then need to be identified and used for each specific case. Although the debate ended with many open questions, the main challenges and next steps have been targeted. CERIC and the other participants have set the basis for setting up a working group to develop and adopt a shared common framework, with standardized data and modelling processes, to facilitate the evaluation of the socio-economic impact of RIs in the near future.

CERIC-ERIC meets the Scientific Counsellors of the Permanent Representations in Brussels of its Members

Brussels, October 14th 2015



Fabio Mazzolini, CERIC Deputy Director for European and International Relations at the meeting in Brussels.

On October 14th 2015, CERIC-ERIC organized in Brussels an informal meeting with the Scientific Counsellors of the Permanent Representations in Brussels of the Countries members of CERIC. During this meeting, hosted by the Representation Office of the Italian region Friuli Venezia Giulia, Fabio Mazzolini (CERIC Deputy Director for the EU and International Relations) presented some recent developments of the Consortium in the fields of science and management, such as the Italian implementation of the VAT exemption for the Representing Entities.

The meeting was attended by the Scientific Councillors of Austria, Czech Republic, Hungary, Poland, Romania, Slovenia and by representatives of the Mission of the Republic of Serbia to the EU, of the European Commission DG-RTD, of the Skona European Office in Brussels, of the ERRIN Association and of the Italian Ministry of Cultural Heritage (MIBAC).

CERIC @ NMI3 Final Meeting
 CERIC presented its model to the neutron source community

October 10th 2015, Copenhagen – Denmark

In mid-October, the last meeting of the FP7 project NMI3, involving the Neutron source facilities in Europe, was held in Copenhagen, to summarize the results reached and the challenges that Neutron facilities have to face in the upcoming future. Matthias Girod presented CERIC, its model, governance and functioning. In particular, the audience showed a major interest for the integrated access procedure, based on a two-steps deadline and on an IT system coherent with the complementarity of the available techniques. The evaluation work of the international and independent review panel has also been highly appreciated. The neutron community as a whole, stimulated by the concept of integration of methods and multidisciplinary techniques, has shown availability and openness for future collaborations with CERIC and for considering the opportunity to cooperate by integrating the neutron-based instruments and techniques with other sources and facilities.

Highlights

The PaGES project, funded by Friuli Venezia Giulia, will soon start its activities
 In February 2016 its first seminars

February 2016 – Trieste, Italy



From right to left: Fabio Mazzolini – PaGES Project Manager, Loredana Casalis – senior scientist at Elettra Sincrotrone Trieste, and the professors of the schools partners of the project, at the PaGES kick-off meeting in Trieste.



Students of three different high schools based in the Friuli Venezia Giulia region, Italy, (G.Galilei - Trieste, Duca degli Abruzzi - Gorizia and A.Einstein – Cervignano del Friuli) will participate in the PaGES project, which foresees a specific training for planning, managing and executing a scientific experiment. Participants will have the chance to meet senior scientists and project managers of CERIC-ERIC and Elettra Sincrotrone Trieste (CERIC partner), in order to learn how to set up and manage an experimental project in all its relevant phases.

During its first seminars scheduled in February 2016, the PaGES project and its planned activities will be presented to the students, who will also be specifically introduced to project management theory.

You can read more news and keep updated about CERIC opportunities and events on our website: www.ceric-eric.eu