

International workshop and training school on



# Electrochemistry in Historical and Archaeological Conservation



**11-15 January 2010**  
**Lorentz Center, Leiden, Netherlands**

## Programme

**Monday 11 January 2010**

08:45-09:45	Registration and coffee
09:45-10:00	Welcome by the Lorentz Center and the scientific organizers
10.00-11:00	<b>Session 1: Analysis</b> <ul style="list-style-type: none"><li>– Local investigation of corrosion processes by coupled electrochemical and spectroscopic techniques, M.C. Bernard, S. Joiret, V. Vivier</li><li>– Layer-by-layer identification of bronze alteration products using Tafel analysis of frequency-dependent square wave voltammetric responses, A. Doménech Carbó, M.T. Doménech Carbó</li></ul>
11:00-11:30	Coffee break
11:30-12:30	<b>Session 1: Analysis</b> <ul style="list-style-type: none"><li>– Identification of metals and alloys using PIGE/VMP, V. Costa</li><li>– Evidence of tin-coating on archaeological ferrous artefacts by voltammetry of microparticules, E.Ottenwelter</li></ul>
12:30-14:00	Lunch break
14:00-15:30	<b>Lab experiments “metal analysis with portable electronic devices”</b> <b>Group discussion in parallel (moderated by D. Thickett)</b> <ul style="list-style-type: none"><li>– Introduction to the equipment and the conditions of the experiments, C. Degriigny and V. Costa</li><li>– Use of Ecorr vs time as a spot test for copper based alloys, C. Degriigny</li><li>– Voltammetric curves to analyse metals (corrosion products and the metal itself), V. Costa</li></ul>
15:30-16:00	Coffee break
16:00-17:30	<b>Lab experiments “metal analysis with portable electronic devices”</b> <b>Group discussion in parallel (moderated by D. Thickett)</b> <ul style="list-style-type: none"><li>– Introduction to the equipment and the conditions of the experiments, C. Degriigny and V. Costa</li></ul>

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17:30	Wine and cheese party

## Tuesday 12 January 2010

09:00-09:30	<b>Summary of Monday's experiments and group discussions</b>
09:30-10:30	<b>Session 2: Cleaning</b> <ul style="list-style-type: none"> <li>– Cleaning of CH artefacts: an overview, C. Degrigny</li> <li>– Finding a protocol system to enable conservators-restorers make the right choices in electrolytic treatments, P. Storme and F. Urban</li> </ul>
10:30-11:00	Coffee break
11:00-12:30	<b>Session 3: Stabilization</b> <ul style="list-style-type: none"> <li>– Stabilization of CH artefacts: an overview, C. Degrigny</li> <li>– Remote monitoring of electrolytic treatment: application to the conservation of marine artefacts, E. Guilminot</li> <li>– Stabilization of large iron objects removed from the sea using in-situ electrolysis as opposed to electrolysis in baths with electrolytes, E. Siova</li> </ul>
12:30-14:00	Lunch break
14:00-15:30	<b>Lab experiments "local electrochemical cleaning and stabilization"</b> <b>Group discussion in parallel (moderated by K. Stemann)</b> <ul style="list-style-type: none"> <li>– Introduction to the equipment and the conditions of the experiments, C. Degrigny and E. Guilminot</li> <li>– Local cleaning of silver tarnish (on silver, silvered and gilt silver objects), C. Degrigny and V. Costa</li> </ul>
15:30-16:00	Coffee break
16:00-17:30	<b>Lab experiments "electrochemical cleaning and stabilization by full immersion"</b> <b>Group discussion in parallel (moderated by K. Stemann )</b> <ul style="list-style-type: none"> <li>– Introduction to the equipment and the conditions of the experiments, C. Degrigny and E. Guilminot</li> <li>– Consolidative reduction of corroded lead, C. Degrigny and E. Guilminot</li> <li>– Remote monitoring of electrochemical treatment, E. Guilminot</li> </ul>

### Wednesday 13 January 2010

09:00-09:30	<b>Summary of Tuesday's experiments and group discussions</b>
09:30-10:30	<b>Session 4: Protection</b> <ul style="list-style-type: none"> <li>– Electrochemical assessment of protection systems on metal artefacts, Emilio Cano</li> <li>– Metal Protection by Ultra-thin Organic Films - Surface Modification with Self-Assembled Monolayers (SAMs), Luisa Maria Abrantes</li> </ul>
10:30-11:00	Coffee break
11:00-12:30	<b>Session 4: Protection</b> <ul style="list-style-type: none"> <li>– Electrochemical assessment of carboxylation treatments for the protection of Pb, Zn, Cu and Fe and application to the protection of Cultural Heritage artefacts, F. Mirambet</li> <li>– New Routes for Metal Protection – Combining Conducting Polymers with SAMs, Luisa Maria Abrantes</li> <li>– Silane coatings for outdoor bronzes, P. Letardi, R. Mazzeo</li> </ul>
12:30-14:00	Lunch break
14:00-15:30	<b>Lab experiments “Electrochemical assessment of protection systems on metal artefacts”</b> <b>Group discussion in parallel (moderated by V. Argyropoulou)</b> <ul style="list-style-type: none"> <li>– Introduction to the equipment and the conditions of the experiments, P. Letardi, E. Cano</li> <li>– EIS for testing protection systems, P. Letardi, E. Cano</li> </ul>
15:30-16:00	Coffee break
16:00-17:30	<b>Lab experiments “Electrochemical assessment of protection systems on metal artefacts”</b> <b>Group discussion in parallel (moderated by V. Argyropoulou)</b> <ul style="list-style-type: none"> <li>– EIS for testing protection systems, P. Letardi, E. Cano</li> </ul>
19:00	Workshop dinner

### Thursday 14 January 2010

09:00-09:30	<b>Summary of Wednesday's experiments and group discussions</b>
09:30-10:30	<b>Session 5: Testing and monitoring</b> <ul style="list-style-type: none"> <li>– In-situ time-resolved monitoring of metal surfaces through spectroelectrochemical experiments using an automated electrochemical cell, M. Dowsett</li> <li>– Demonstration of eCell, M. Dowsett</li> </ul>
10:30-11:00	Coffee break
11:00-12:30	<b>Session 5: Testing and monitoring</b>

	<ul style="list-style-type: none"> <li>– An in-situ X-ray absorption spectroelectrochemistry study of the response of artificial chloride corrosion layers on copper to remedial treatment, A. Adriaens</li> <li>– In-situ spectroelectrochemical study of the growth process of a lead decanoate coating as corrosion inhibitor for lead surfaces, M. Dowsett</li> <li>– Electrochemical imaging, S. Szunerits</li> </ul>
12:30-14:00	Lunch break
14:00-18:00	Visit to the Museum Boerhaave (Leiden) – contact person Hans Hooijmaijers

### Friday 15 January 2010

09:00-10:00	<p><b>Session 6: Standards and education</b></p> <ul style="list-style-type: none"> <li>– An examination of education programmes (Bachelor and Masters) offered by European Conservation Departments in offering learning outcomes involving the application of electrochemical techniques to conservation. What is the level of competences needed by the profession and practice of the conservator-restorer and do the current education programmes meet this need?</li> </ul> <p>Participants at the meeting that teach the application of electrochemical techniques to C-Rs in training will be asked to present their course(s) to the audience. 10 minutes will be allotted to each presentation. Following these presentations, a group discussion will take place to examine how in depth education in the application of electrochemical techniques to conservation is needed for the education of C-Rs and at what level should this training take place in terms of European Qualifications Framework (EQF). If further development is needed, how can the Lifelong Learning Programme help in obtaining funds for this need?</p> <p>Selection of not more than 4 possible speakers (10 minutes each) so that there can be a 20 minute discussion afterwards.</p> <p>V. Argyropoulos, C. Degrigny, V. Costa</p>
10:00-10:30	<p><b>Session 6: Standards and education</b></p> <ul style="list-style-type: none"> <li>– The need for standards in metals conservation under the CEN/TC 346 <i>Conservation of Cultural Property</i> framework, V. Argyropoulos</li> <li>– Discussion</li> </ul>
10:30-11:00	Coffee break
11:00-12:30	<p><b>Session 7: Future activities and collaborations</b></p> <ul style="list-style-type: none"> <li>– Recent history of the practical use of electrochemical techniques (in the Netherlands/Europe), A. Pappot</li> <li>– ETIC activities, C. Degrigny</li> <li>– Group discussion</li> </ul>
12:30	Lunch break