



10th International Symposium on
Electrochemical Impedance Spectroscopy

June 19 – 24, 2016

Hotel Eurostars Isla de La Toja
A Toxa – Galicia – Spain

Programme
and
Book of Abstracts

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PREFACE

The work by Epelboin and his group in Paris in the 1960's that developed impedance as analytical tool for elucidating corrosion mechanisms, and the apparition of automated Frequency Response Analysers in the late 1970's lead to the great development of the technique in the 1980's. The series of International Symposia on Electrochemical Impedance Spectroscopy (the term EIS was coined by F. Mansfeld in the early 1980's) initiates in Bombannes, France, in **1989**, organised by Claude Gabrielli.

An important feature of these meetings is that all participants stay together at the meeting venue for the entire duration of the event, allowing for fruitful discussions that bring new insights on the latest developments of the technique with the leading scientist in the field. This ambience is further promoted by sharing social activities including all the meals, excursions, gala dinner and other social events that stimulate a sense of group in the scientific community.

The particular philosophy of the EIS symposia has led to further successful meetings organised by:

Digby Macdonald at Santa Barbara, CA, USA (**1992**),

Jean Vereecken at Ysermonde, Belgium (**1995**),

Oscar Rosa Mattos at Angra do Reis, Brazil (**1998**),

Pier Luigi Bonora at Marilleva, Italy (**2001**),

Mark E. Orazem at Cocoa Beach, FL, USA (**2004**),

Nadine Pébère at Argeles-sur-Mer, France (**2007**),

João S. Fernandes and M. Fátima Montemor at Carvoeiro, Portugal (**2010**), and

Masayuki Itagaki at Okinawa, Japan (**2013**).

Because of that history and specific format, the International Symposia on Electrochemical Impedance Spectroscopy have certainly become the most important events on the subject of EIS.

The present 10th EIS conference is being held at A Toxa (Galicia, Spain) and the Organizing Committee wishes to continue the successful tradition of the previous symposia. EIS 2016 intends to bring together the experts on the most recent advances and applications of Electrochemical Impedance Spectroscopy in the fields of Corrosion (kinetics, protection by coatings, passivation), Energy (conversion and storage), Mechanisms and Modelling, Biomedical and Biological Systems (including sensors), Localised Measurements and Data Processing.

We wish to express our gratitude to all the members of the Organizing Committee and to the ENCOMAT group members to allow this conference to continue the EIS tradition. We also thank the members of the International Scientific Committee for giving us the opportunity to organize in 2016 the 10th EIS conference in the lovely west coast of Spain, Galicia.

Furthermore, we welcome all of you to A Toxa and wish you a fruitful stay, building new personal and professional relationships.



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Program

Program Posters

List of Poster Presentations (Posters should be available for discussion from Monday to Thursday)

<p>Energy</p> <p>013P (E. M. Ortega) 040P (Y. Irokawa) 051P (A. Giuliano) 052P (A. Giuliano) 059P (J.H. Hang) 064P (H. Kato) 065P (Y. Gamano) 087P (M. Serrapede) 088P (P. Rivolo) 123P (N. Harms) 136P (T.M. Silva) 138P (H. Fukunaga)</p> <p>Sensors</p> <p>137P (C. Brett)</p> <p>Theory/Experimental techniques</p> <p>025P (A. Moya) 034P (C.A. Schiller) 101P (D.A. Harrington) 111P (C. Álvarez-casillas) 113P (A. Battistel) 114P (T. Holm) 118P (A. Rodríguez) 124P (V. Vivier) 125P (M. Keddiam) 126P (M. Keddiam) 144P (G. Mészáros)</p>	<p>Corrosion and Protection</p> <p>004P (I. Preker) 016P (M. Aparicio) 023P (F.J. Rodríguez-Gómez) 049P (D. Álvarez) 056P (H. G. de Melo) 069P (V. S. Egorkin) 082P (M. Terada) 084P (K. Raheem) 092P (A.M. Santos) 095P (C. Molena de Assis) 100P (V. Figà) 102P (A. Gómez-Sánchez) 116P (I. V. Aoki) 117P (E. Bravo) 120P (K. Miranda) 122P (C.M. Abreu) 127P (M.C. Pérez) 130P (A.S. Castela) 131P (J.D. Santos) 132P (R.G. Duarte) 142P (C. Alvarado) 143P (M. Sancy) 145P (A. Maltseva) 148P (N. Wagner) 149P (B. Puga) 150P (L. Vivar Mora)</p>
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Assessment of the influence of Concrete Modification in the Water Uptake/Evaporation Kinetics by Electrochemical Impedance Spectroscopy

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The corrosion of reinforced steel in concrete is a worldwide problem. An important factor that can affect the process is the concrete composition, which is a particular important factor for modified concrete. The kinetics of water absorption and water evaporation is affected both by the environment conditions and by the additives. This is important for powdered additives which can partially occlude the porous structure. These additives can affect the porosity and permeability of the concrete.

Reinforced concrete samples were modified by adding spent Fluid Cracking Catalysts (SFCC) and an environment friendly commercial inhibitor. The samples were submitted to a 15 days of immersion/15 days of drying, in continuous cycles, using a NaCl saturated solution. Electrochemical Impedance Spectroscopy (EIS) measurements were carried out regularly during immersion and during drying.

It was concluded the additives interfere with the natural water adsorption/evaporation kinetics in concrete, which is a process resulting from the joint effect of diffusion and capillary processes. These interferences occur by three combined mechanisms: the first two are the pore blocking and pozzolanic mechanisms, which are the result of structural changes in concrete and affect the diffusion processes/mechanism; the third one is the capillary mechanism, which is strongly dependent from the chemical nature of the additives, but can also be influenced by structure modifications. This mechanism can increase, reduce or eliminate the capillary processes.

Keywords: Concrete, water content kinetics, inhibitor, SFCC, EIS.

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