
1. Introduction
The International Workshop on Application of Electrochemical Techniques to Organic Coatings (AETOC), held in Sintra, followed the trend of the two previous such meetings, the first held in Schliffkopf (Germany) in 1999 and the second in Jurata (Poland) in 2001. This third workshop was organized by the Chemical Engineering Department of the Technical University of Lisbon, in association with the European Federation of Corrosion (event no. 270), through its working party no.14—“Coatings”.

The workshop had a total of 39 participants, coming from Belgium, France, Germany, Holland, Italy, Poland, Serbia-Montenegro, Spain, Switzerland, UK, USA, Mexico and Portugal. Following the workshop, a half-day meeting of the ISO-TC35 working party on Standardization of Electrochemical Impedance Spectroscopy for Organic Coatings was also held.

The venue for both meetings was Tivoli Hotel, in Sintra, a romantic and historic village, located in the hills, near Lisbon. The scientific program was intensive, with a total of 23 papers and a round-table discussion in the period of two days. The social program, which consisted of a visit to the the Royal Palace of Pena and a dinner at the Palace of Seteais, certainly gave a good opportunity for relaxing and enjoying the local beauty, and was much appreciated by the participants.

This special issue, which includes most of the papers presented at the workshop, is now published by Progress in Organic Coatings, thanks to the interest and support of Prof. G. Bierwagen who has now participated in all three such workshops.

2. Brief overview of the workshop
The arrival of the participants took place on Wednesday, October 22nd, with beautiful weather expecting them in Sintra. A cocktail party was arranged by the organizers to provide an opportunity for the participants to meet. The technical sessions started on Thursday morning and went until Friday noon, with a total of fifteen presentations on the first day.

In terms of the electrochemical techniques used in the various works, generally the authors made an intensive use of electrochemical impedance spectroscopy (EIS), for fundamental research (see for example, the paper by Miszczyk) but also for practical devices, as illustrated by the paper presented by Blekkenhorst. An experimental development of the EIS technique for the determination of instantaneous spectra, coming from the Darowicki group, in Poland, was also of great interest. The EIS technique was also used in most of the presentations, either to monitor systems in the industry (Ostwald – TKS, Germany and Korobov – Carboline, USA), to evaluate the efficiency of cathodic protection (Touzain – La Rochelle, France), to assess the aging of coatings after mechanical degradation (Fedrizzi – Rome, Italy), to interpret the mechanisms of protection by pigments and pre-treatments (Duarte and Bastos, under the supervision of Ferreira and Simões, respectively, Rodríguez, from Mexico City and Pérez from Vigo, Spain), to investigate the properties of electron-beam curable coatings (Williams – Swansea, UK) and also study the temperature variation of coating properties (Vogelsang – Sika, Switzerland), just to mention a few.

Two of the presentations put great emphasis on electrochemical noise, either for sacrificial primers or for the assessment of environmental-friendly coatings (Bierwagen, Fargo-ND, USA and Mills – Northampton, UK, respectively). One of the presentations was devoted to the use of the scanning Kelvin probe and the scanning acoustic microscope (SAM). In this paper, Reddy and Sykes (Oxford, UK) described the SAM technique, in which the sites with corrosion activity are detected by the changes in an acoustic signal that propagates through the coating and the external medium. The use of one
other localized technique, the scanning vibrating electrode technique (SVET) was also illustrated in several papers, in particular that by Souto (Tenerife, Spain) and also those from the Lisbon group.

One point of practical interest for all the participants was a device presented by Schröder (Highway Research Institute, Germany), which applies a square alternating voltage to the coating and measures the resulting current, thus obtaining information on the state of the coating.

In terms of the coatings used, most of them were classical barrier coatings, although other coatings were treated, namely metal-rich primers, cataphoretic paints undergoing filiform corrosion (Olivier – Mons, Belgium), radiation-cured coatings and also electrodeposited conductive coatings (Popovic, under the supervision of Misković-Stanković, from Belgrade, Serbia and Montenegro). The question of banning Cr(VI) from pre-treatments was present in several papers, namely Deflorian (Trento, Italy), who proposed a treatment based upon the chemistry of Cr(III). The group originating from Trento, Italy, addressed the issue of damage to coatings by means other than chemical factors with a study on the effect of abrasion (Rossi) and another on the thermal aging combined with mechanical deformation (Fedrizzi).

Following all the presentations, the participants were driven to Palacio da Pena, a royal summer residence in the romantic style, built by Prince Ferdinand of Saxony-Coburg-Gotha, consort to Queen Maria II, around 1840. Unfortunately, due to the changes in the weather, we could not enjoy the 270 ha garden surrounding this palace, recently classified as a UNESCO heritage site. Following this visit, a Round
Table discussion took place. This session was chaired by G. Bierwagen and J. Sykes and in it many comments and questions about the presentations were made, further to a discussion on the evolution and the possibilities of the various techniques. This session was followed by a dinner banquet at Palacio de Seteais, a 19th century palace converted into a hotel unit. The heavy rain brought some discomfort, but nevertheless the atmosphere inside was quite agreeable.

Although the banquet marked the closing of the workshop, many of the participants chose to stay for the ISO standardization meeting, where a much more technical and less scientific approach was taken. The aim of this meeting was to discuss the text of a new international standard for the use of EIS to high performance coatings, and it was open to all those who wanted to attend and, given the subject, vivid discussions arose in that morning. The meeting was closed at the end of the morning, when most of the participants left Sintra towards Lisbon or directly to the airport for their return home.

3. List of presentations

G.P. Bierwagen, A. Stamness, M. Nanna, K. Stanek, Examination of metal rich sacrificial primer coatings by ENM and EIS.

D.J. Mills, H.T. Singh, C.P. Woodcock, Use of electrochemical noise method to investigate the anti-corrosive properties of a set of compliant coatings.

M.-G. Olivier, M. Poelman, M. Demuyck, J.-P. Petitjean, EIS evaluation of the filiform corrosion of aluminium coated by a cataphoretic paint.


S. Rossi, F. Deflorian, L. Fontanari, A. Cambruzzi, P.L. Bonora, Electrochemical measures to evaluate the abrasion damage on protective organic system.

A. Miszczyk, T. Schauer, Electrochemical approach to evaluate the interlayer adhesion of coatings.

G. Gleijm, F. Blekkenhorst, Dielectric measurements of organic coatings on sheet metal products under atmospheric conditions.

J. Vogelsang, H. Ochs, EIS and RV investigations on Arrhenius-type change of coating properties.

K. Darowicki, P. Słępski, M. Szocinski, Application of the dynamic EIS to investigation of transport within organic coatings.

Y. Korobov, Service life prediction of topcoated zinc primer at high temperatures using EIS.

S. Touzain, Q. Le Thu, G. Bonnet, Evaluation of the compatibility between cathodic protection and thick organic coatings in seawater using thermally accelerated tests.


C. Ostwald, B. Schinkinger, Oliver Bendick, Electrochemical investigations on modern steel coatings.

R.G. Duarte, A.S. Castela, M.G.S. Ferreira, A comparative study of Cr-containing and Cr-free films for coil coating systems.

A. Bergo, L. Fedrizzi, Thermal aging of painted galvanised steel after mechanical deformation.

A.C. Bastos, A.M. Simões, Comparative electrochemical studies of zinc chromate and zinc phosphate as corrosion inhibitors for zinc.

M. Schröder, An electrochemical method for the evaluation of organic coatings on site.

B. Williams, H.N. McMurray, Coating–pretreatment interactions in electron beam curable coatings investigated using electrochemical impedance spectroscopy.

S. Duval, V. Sauvant-Moynot, EIS applied to the different steps of organic coating life.


M.M. Popović, V.B. Mišković-Stanković, B.N. Gregur, Corrosion studies on electrochemically deposited PANI and...
PANI-epoxy coatings on mild steel in sulphuric acid solution.