FRITZ SCHOLZ —UN HOMENAJE CON MOTIVO DE SU ANUNCIADA JUBILACIÓN

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RESUMEN: El Profesor Doctor Fritz Scholz (Greifswald University) ha anunciado su jubilación para el próximo año. Este artículo es un homenaje a un químico destacado que ha contribuido de manera notable al desarrollo de la química analítica y al estudio analítico del patrimonio cultural y que ha estado muy estrechamente vinculado al Instituto Universitario de Restauración del Patrimonio.

PALABRAS CLAVE: Profesor Doctor Fritz Scholz; Greifswald University

English version

TITLE: ***Fritz Scholz —A Tribute on the Occasion of his Announced Retirement***

ABSTRACT: *Professor Doctor Fritz Scholz (Greifswald University) has announced his retirement for the next year. This article is a tribute to an outstanding chemist that has notably contributed to the development of the analytical chemistry and the analytical studies of cultural heritage and has been narrowly linked to the Institut Universitari de Restauració del Patrimoni.*

KEYWORDS: *Profesor Doctor Fritz Scholz; Greifswald University*

1. A NOTORIUS SCIENTIFIC CARRIER

Professor Doctor Fritz Scholz (Greifswald University) has announced his retirement for the next year. Although, happily, this retirement does not imply the abandon of the scientific work, it provides an excellent opportunity to express our respect for an outstanding scientist and the esteem for the person. Fritz Scholz was born in 1955, he started his higher education studies of chemistry at Humboldt University, Berlin, where initiated his educational and scientific work in 1993. From 1998 he has been working as the Chair of analytical and environmental chemistry at the University of Greifswald, Germany, where he formed the Institute of Biochemistry oriented towars interdisciplinary research. Nevertheless, most of his research was carried out in the fied of electrochemistry where the most recent studies are focused on vesicles and the interaction of free radicals with noble metal surfaces.

During his outstanding career, he published more than 425 scientific papers and has participated at more than 300 conferences, he has been an invited speaker at more than 125 occasions. Due to his relevant contributions to electrochemistry, he was elected a Fellow of the International Society of Electrochemistry in 2015. Among others, Fritz Scholz is the editor and a co-author of the books: Electroanalytical Methods (Springer, 2002, 2nd ed. 2010, and Russian Edition: BINOM, 2006), Electrochemistry of Immobilized Particles and Droplets (Springer, 1st edition 2005; 2nd edition 2015), co-editor of the Electrochemical Dictionary (Springer, 1st edition 2008; 2nd ed. 2012), volumes 7a and 7b of the Encyclopedia of Electrochemistry (Wiley-VCH 2006), Handbook of Reference Electrodes (Springer, 2013), and Chemical Equilibria in Analytical Chemistry (Springer 2019).

His work is completed by a prominent editorial activity as editor of the "Monographs in Electrochemistry" book series (Springer, 19 titles published since 2007) as well as founder and editor-in-chief of two journals: Journal of Solid State Electrochemistry (Springer, since 1997) and ChemTexts (Springer, since 2014). It is important to realize that both journals represent highly innovative contributions to scientific literature. The Journal of Solid State Electrochemistry focused by the first time the scope of an indexed journal in solid state electrochemistry, covering all aspects from purely theoretical to applications in batteries, capacitors, etc. and electroanalysis. In turn, journal ChemTexts –The Textbook Journal- has introduced a totally new concept in scientific publishing: the dissemination of articles for educational purposes on topics weakly treated by textbooks.

This editorial activity reflects a deep interest of Fritz Scholz by history and philosophy of science. Within his publications there are several articles on the history of electrochemistry and electroanalytical chemistry, and a book: Electrochemistry in a divided world. Innovations in Eastern Europe in the 20th century (Springer, 2015) and he has recently initiated and co-edited the first English translation of Wilhelm Ostwald's autobiography, originally published in German (Springer, 2017).

2. A REMARKABLE CONTRIBUTION TO THE ANALYTICAL CHEMISTRY

At this point it is pertinent to underline that the more significant contribution of Prof. Scholz in the electrochemistry science is the development of a branch of the solid state electrochemistry that lead to the invention of the technique of the Voltammetry of Immobilized Microparticles (VIMP) initially termed abrasive stripping voltammetry for mineral analysis. The merit of Fritz Scholz was not only the creation of a technique, but also the study of its theoretical basis, condensed in a series of articles published in1989 in Naturwiss and Fresenius Z. Anal. Chem. (Scholz et al, 1989: 71; 167; 189 571) on ion-insertion electrochemistry and three-phase electrochemistry (including the electrochemistry of immobilized droplets) in collaboration with other theoreticians like Misolav Lovric and Keith B. Oldham (Lovric et al, 1997,1998 and 1999; Oldham et al, 1998). As a result of these theoretical models, the VIMP has a considerable theoretical background which ultimately intersects with the fields of electrocynthesis, electrode modification and ion intercalation processes in batteries, supercapacitors, etc. From the current perspective, the creation of Fritz Scholz, the VIMP, can be considered as possibly the most innovative contribution to electrochemistry in the last decades and a research field in expansion and, in our view, is revolutionary in the meaning of the Kuhn's paradigms epistemology.

VIMP technique provides an electrochemical methodology to study sparingly soluble solids and thus, the VIMP methodology was rapidly expanded to a variety of organic and inorganic compounds and, at the middle of the 1990's, it accumulates a considerable background including, among other issues, quantification and determination of thermochemical parameters. Due to its simplicity, the requirement of amounts of sample limited to few nanograms and its high inherent sensitivity, this technique opened new ways for electroanalysis of application in mineral, semiconductor, superconductor, food, pharmaceutical and archaeometric analysis.

Lattely, importance of the VIMP was recognized by the International Union of Pure and Applied Chemistry (IUPAC) through the publication of a technical report in Pure Appl. Chem. in 2013, and a further review of its application for cultural heritage in the same journal in 2018.

3. CULTURAL HERITAGE AND VIMP

The implication of Fritz Scholz in the cultural heritage and archaeometric domain started with an article published in 1993 in Internat. Lab. where pointed out the possibility of using VIMP for pigment analysis (Lange et al, 1993).

This article inspired us to apply the VIMP in the field of conservation and restoration of cultural goods as a collaboration between the Institut Universitari de Restauració del Patrimoni (IRP) of the Universitat Politècnica de València (UPV) and the Department of Analytical Chemistry of the Universitat de València (UV), initiated around 1997. Our first publications in Anal. Chim. Acta and Electroanalysis in 2000, devoted to the identification of inorganic pigments in paintings and the characterization of manganese species in glazed samples received the attention of Fritz Scholz that contacted with us and gently offered paraffin-impregnated graphite electrodes that improved the performance of our composite electrodes. This was the beginning of a continuous collaboration in which our studies on organic pigments, fibres, ceramic materials, glasses, metal, corrosion products and organic components in works of art and archaeological artifacts always encountered his stimulus.

Fritz Scholz and his wife, Gudrum, come into Valencia in 2007 as member of the tribunal of the PhD Project defensed in the IRP of the UPV by Maria Luisa Vázquez de Agredos Pascual (co-directors María Teresa Doménech Carbó, Antonio Doménech Carbó and Pilar Roig Picazo) entitled *Caracterización químico-analítica de azul maya en la pintura mural de las tierras bajas*. This was the first PhD project in the UPV entirely based on VIMP technique.

Figure 1. Prof. Scholz during the first invited plenary lecture in the IRP in 2008 duing the First European Conference on electrochemical methods applied to the conservation of artworks.

This was the first of succesive visits to our city, at the occasion of the First, Second and Third editions of the European Conference on electrochemical methods applied to the conservation of artworks organized by the IRP in 2008, 2014 and 2017 (Figures 1-4) always supporting our research task around the application of electrochemical techniques for the study of cultural heritage. Fritz Scholz suggested the preparation of our book, coauthored by Virginia Costa, Electrochemical Methods for Archaeometry, Conservation and Restoration, published by Springer in 2009, and supported the subsequent research on extreme heritage (studies on Santos Juanes church in Valencia directed by Pilar Roig Picazo), Valencian baroque painters, authentication, tracing and dating archaeological metals. Since the beginning of the collaboration a total of eight PhD projects based on VIMP have been developed in the IRP-UPV in addition to other four PhD projects defensed in the UV, co-directed by IRP professors.

Figure 2. Prof. Scholz in the opening ceremony of the First European Conference on electrochemical methods applied to the conservation of artworks organized by the IRP in 2011.

The participation of Fritz Scholz in this collaborative work, which currently continues, has contributed to the consolidation of the IRP as a scientific institution of recognized prestige in the international field of analytical studies of cultural heritage.

Figure 3. Prof. Scholz in the commemorative picture with the attendants to the Second European Conference on electrochemical methods applied to the conservation of artworks in 2014 that took place in parallel to the EMERGE14 congress organized by the IRP.

Figure 4. Prof. Scholz during the Third European Conference on electrochemical methods applied to the conservation of artworks organized by the IRP in 2017.

The importance of the scientific work of Fritz Scholz is parallel to his human quality, illustrated by his concern on educational issues and his repeated activity as a visiting professor and lecturer (Chile, Hungary, Poland, Slovakia,…) and the performance of collaborations with research groups all around the world. All the work of Fritz Scholz is impregnated by a rigorous humanism and a solid ethics. We are privileged by his friendship attitude towards our research and the maintenance of this collaboration so inspired in the human dimension than in the purely scientific one. Let us express our wish that these words can reflect the human and scientific dimension of Fritz Scholz as well as the confidence in that, after the official retirement, he continues his innovative working on science and collaboration with the IRP/UPV-UV institutions.

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