学 术 报 告

Disentangling the aspects that influence the electrochemical hydrogen reaction

State Key Laboratory of Chemical Resource Engineering

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时　　间：2019年9月9日 上午9：30-11：30

地　　点：无机楼107

Biography: Nicolas Alonso-Vante is a Professor at the IC2MP UMR CNRS 7285 at the University of Poitiers. He obtained his degrees of Docteur Troisi ème Cycle (1981) and Doctorat d'Etat (1984) from the University of Strasbourg, respectively. Under the auspices of the Alexander von Humboldt foundation he was awarded a two years Post-Doc fellowship (1985-1986) at the Hahn-Meitner-Institut-Berlin (now Helmholtz-Zentrum Berlin), where he further worked as a senior scientist in the department of solar energy until August 1997. He is the author of over 200 publications, book chapters, editor of a two-volume e-book on electrochemistry in Spanish, author of two books, and 6 patents. He has received the awards of the National Polytechnic Institute-Mexico as a R&D distinguished graduate, and of the Mexican Council of Technology SNI-III recognition as a Mexican researcher working outside Mexico, and has been awarded the NM Emanuel Medal from the Russian Academy of Science. He is also a member of the International Society of Electrochemistry, the Electrochemical Society, the Bunsengesellschaft f ür Physikalische Chemie, and of the International Academy of Electrochemical Energy Science (IAOEES). Member of the Editorial board of Fuel Cells Journal, Catalysts, Surface.

Herein, in order to track the effect from the supporting material, selected catalytic nanostructures (based on precious and non-precious centres) supported on surface chemical modified carbon materials (e.g., amorphous carbon, carbon nanotubes and graphite) were generated to anchor chemically and/or photochemically selected catalytic centres. With the support of various physical-chemical characterization techniques, the resulting electrochemical evaluation suggests that, in an acid or alkaline environment, the hydrogen evolution reaction is favoured when such electrocatalytic nanostructures interact with the supporting material, observing, e.g., that the HER kinetics proceeds via Volmer-Heyrovsky as the rate determining step of the reaction. Therefore, the combination of high specific surface area, a variety of active sites, and cost-effective nanomaterials is a key research concept.

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