École polytechnique fédérale de Lausanne (EPFL) Valais/Wallis
Institute of Chemical Sciences and Engineering (ISIC)
Basic Science Faculty (SB)
Energypolis, Rue de l'Industrie 17, CH-1950 Sion, Switzerland

ENERGYPOLIS SEMINAR

27. 8. 2015, 16:00 - 17:00, ENERGYPOLIS Sion, 4th floor, Seminar room

Catalytic coatings fabricated by magnetron sputtering: Applications in H_2 generation reactions.

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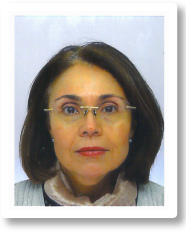
The magnetron sputtering technology is shown in this talk as a tool for fabrication of tailor-made catalytic coatings. Plasmas are characterized by a non-equilibrium physical-chemical environment that allows materials to be grown or modified at a lower temperature far from the thermodynamic limits. Among these methods, magnetron sputtering deposition (**MS**), from single- or multi-target configurations, is a robust technology that can be easily scaled-up. The control of microstructure, as well as composition, will be presented in the case of study of Co-based catalysts for the hydrolytic hydrogen generation reaction from sodium borohydride [1]. The deposition methodology to fabricate the catalytic coatings has been applied to a great variety of substrates such as polymeric membranes, flexible substrates, or ceramic and metallic foams.

Also recent works have shown an interest in the study of nanostructuration of thin films and surfaces by low-energy He plasma treatments and He incorporation via MS. The nanostructured surfaces have been applied for example as photoelectrodes for use in solar water splitting processes [2]. Our laboratory developed recently a pioneering work on magnetron sputtering deposition of porous coatings with He plasmas [3]. The combination of glancing deposition with He (or He/Ar mixtures) as process gas [4] is proposed in this talk for future studies to achieve enhanced porosity and nanostructuration of surfaces for catalytic applications.



Prof. Asunción Fernández

CV: Asunción Fernández

Born 2. May 1958 in Vigo, Spain, Professor Asunción Fernández graduated in Chemistry at the University of Cádiz (1980) and in Physics at UNED (Spanish Open University) (1984). From 1980 to 1983 she carried out her PhD work at Max-Planck Institut für Strahlenchemie in Mülheim a.d. Ruhr (Germany) under the guide of Prof.H.Kisch. During this period she got fellowships from the Max-Planck Society and the Alfried Krupp Foundation. She obtained her Dr. rer. nat. Degree at the University of Dortmund in June 1983. The topic of this first stage research was the photocatalytic production of hydrogen from water in the presence of semiconductor catalysts.

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References:

[1] "Supported Co catalysts prepared as thin films by magnetron sputtering for sodium borohydride and ammonia borane hydrolysis ". M. Paladini, G. M. Arzac, V. Godinho, M.C. Jiménez de Haro, A. Fernández. Applied Catalysis B-Environmental 2014, 158, 400-409. [doi: 10.1016/j.apcatb.2014.04.047]

[2] "Efficient Plasma Route to Nanostructure Materials: Case Study on the Use of m-WO3 for Solar Water Splitting". M. De Respinis, G. De Temmerman, I. Tanyeli, M.C.M. van de Sanden, R.P.Doerner, M.J.Baldwin, and R.van de Krol, ACS Applied Materials & Interfaces 2013, 5, 7621−7625.

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