XX Simpósio Brasileiro de Eletroquímica e Eletroanalítica
Center Convention – Uberlândia - MG
17 a 21 de agosto de 2015

Design of active and stable electrochemical interfaces

N. M. Markovic*

Argonne National Laboratory, Materials Science Division Argonne Il 60439

Abstract: Electrocatalysis lies at the heart of the chemical phenomena that take place at electrochemical interfaces. In the feature it will be the key to driving technological innovations that are urgently needed to deliver reliable, affordable and environmentally friendly energy. In this lecture, we describe how a synergetic interaction between fundamental science and technological progress has resulted in both greatly enhanced understanding of electrocatalytic systems and the development of practically improved materials for fuel cells, electrolyzeres and batteries. We demonstrate that it is indeed possible to develop distinctive experimental strategy that will enable the elucidation of structure function relations for the oxygen and hydrogen electrochemistry on well-characterized materials (metals and oxides) in both water-based electrolytes and organic environments. The presentation will also address critical functional links between activity and stability of electrochemical interfaces, relationships that is of paramount importance but rarely discussed. Although the field is still in its infancy, a great deal has already been learned and trends are beginning to emerge that give some predictive ability with respect to the near-surface structure and nature assumed by electrode materials and double layer components and their activity, stability and selectivity towards simple molecules. We conclude that understanding the complexity (simplicity) of electrochemical interfaces would open new avenues for design and deployment of alternative energy systems.

*__E-mail__: nmmarkovic@anl.gov