

Anion Sensing Using Optical and Resistive Transducers

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Abstract

Anion adsorption at the electrochemical interface is fundamental process of considerable importance for many applications. One of them is chemical sensing and effective chemical sensor design. In particular, the demand is for sensors capable of *in-situ* monitoring changes of the anion concentration in anolyte with high precision, redundancy and reversibility. In this talk, two different approaches to HS⁻ and Cl⁻ sensing are demonstrated. The chemoresistive sensing and surface design for HS⁻ will cover the first part of the talk. The emphasis will be to show an effective approach to modification of the Au surface with AuPd alloy enabling reversible and reproducible sensor operation¹. In the second part of the talk, the optical transducer development for Cl⁻ sensing will be presented. The sensing mechanism orchestrates several phenomena transforming an optical fiber with Bragg grating into a functional electrochemical sensor². For both discussed approaches a full derivation of transduction equations is presented.

¹ K Ahmadi, D Wu, N Dole, OR Monteiro, SR Brankovic, ACS sensors 4 (9), 2442

² S Dalgamouni, D Benhaddou, SR Brankovic, Electrochimica Acta 525, 146064

Biography of the Speaker



Stanko R. Brankovic is a Professor at the Electrical and Computer Engineering and Chemical and Biomolecular Engineering Departments, University of Houston (2005-present). His group studies physical and chemical processes at the electrochemical interface and their use to produce materials and structures with novel functionality and application. Research activities are supported by federal (NSF, DOE, DOD), private and state grants and they evolve around areas of Sensors, Magnetic Materials, Thin Films, Electrocatalysis and Nanofabrication.

Professor Brankovic received his B.E. in Chemical and Biochemical Engineering in 1994 from the University of Belgrade and Ph.D. in Science and Engineering of Materials in 1999 from the Arizona State University. Before joining the University of Houston (2005), he spent two years as postdoctoral fellow at the Brookhaven National Laboratory (1999-2001) and four years as a research staff member at the Seagate Research Center (2001-2005).

Dr. Brankovic is the Fellow of The Electrochemical Society (2021). He has served as the Chair of the Electrodeposition Division of The Electrochemical Society (2017-2019) and as the Chair of the Material Science Division of the International Society of Electrochemistry (2015-2017). He is the recipient of the University of Houston Research and Excellence Award (2010), National Science Foundation Faculty Early Career Development Award (2010), Electrodeposition Research Award of the Electrochemical Society (2017) and the Best Fundamental Paper Award of the American Institute of Chemical Engineering (2017). More information about Dr. Brankovic's group and research interests are available at: <http://ecnfg.ece.uh.edu>.