

# Preface

Electrochemistry has been studied for long time and its importance is growing more and more because of its not only fundamental interest but also expected central roles in a future sustainable society. Electrochemistry mainly deals with charge transfer at solid/liquid interfaces, which is a key step in energy conversion and materials transformation as well as biological processes.

Professor John O'M Bockris contributed much not only to fundamental and applied electrochemistry such as structure of double layer, kinetics and mechanism of the electrochemistry of hydrogen and oxygen, electrocatalysis, adsorption and electrochemical oxidation of small organic molecules, fuel cells, electrocrystallization, theoretical electrochemistry, new methods, photoelectrochemistry, bio-electrochemistry, corrosion and passivity, hydrogen in metal, ionic solutions and ionic liquids, and molten silicates and glasses but also to socio-economic issues for a sustainable society such as hydrogen economy for over half a century from 1945 until his retirement in 1997. In addition to his numerous (around 750) publications of original papers, he published about 25 influential books ranging from fundamental/applied electrochemistry to socio-economic subjects including "Fundamental Aspects of Electrocrystallization (1967)," "Fuel Cells; Their Electrochemistry (1969)," "Modern Electrochemistry (1970)," "The Electrochemistry of Cleaner Environment (1972)," "The Solar Hydrogen Alternative (1975)," "Environmental Chemistry (1977)," and "Energy Options (1980)." His contribution as an Editor of the important series of "Modern Aspects of Electrochemistry" (1954–) and "Comprehensive Treatise of Electrochemistry" (10 volumes; 1980–1985) must also be mentioned. He mentored many (close to 100) Ph.D. students, who later became leaders in electrochemistry worldwide including two great electrochemists, Profs. Parsons and Conway, postdoctoral fellows, and visiting scientists.

This book honors Prof. Bockris, who passed away in July 2013. In first chapter, Prof. Bockris' article on his electrochemical life is reproduced from *J. Solid State Electrochemistry* so that not only his contribution to wide ranges of fundamental and applied electrochemistry as well as solar-hydrogen concept but also how electrochemistry has been developed in the latter half of the twentieth century can be understood. In the following chapters, leading scientists discuss current status

of the various subjects in both fundamental and applied electrochemistry and solar-hydrogen concept such as electrocatalysis, fuel cells, electrochemical theory, electrochemistry of single crystals, in situ techniques, rechargeable batteries, passivity, and solar-fuels.

I am very happy to be an Editor of this book as I am indebted to Prof. Bockris who taught me how electrochemistry is interesting and important when I was his Ph.D. student 40 years ago. I am very grateful to the authors for their contributions and Mr. Ken Howell for his help in the planning stage of this book.

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