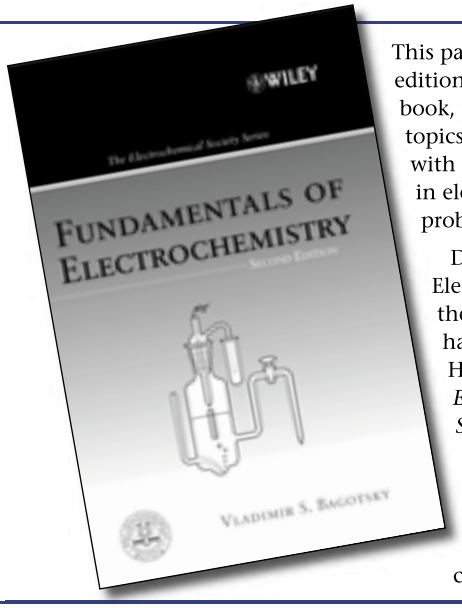
Just Published: *Fundamentals of Electrochemistry*



This past December, ECS was pleased to add to its monograph series, the second edition of *Fundamentals of Electrochemistry* by Vladimir S. Bagotsky. This new book, published by John A. Wiley & Sons, gives the basic outline of most topics of theoretical and applied electrochemistry for students not yet familiar with this field, as well as an outline of recent and advanced developments in electrochemistry for people who are already dealing with electrochemical problems.

Dr. Bagotsky is a retired professor from the Frumkin Institute of Electrochemistry at the Russian Academy of Sciences. Previously he headed the new battery system department of Moscow Power Sources Institute. He has extensive experience with both theoretical and applied electrochemistry. He has authored 400 scientific papers, the first edition of *Fundamentals of Electrochemistry*, and served on the editorial boards for the *Journal of Power Sources and Elektrokhimiya*.

In addition to this important contribution to the body of work on electrochemistry, Dr. Bagotsky will leave another legacy: he is contributing all of his royalties to ECS, for which the Society would like to express its sincere thanks. The author has had a long and interesting career; and he recently shared some of his experiences with us.

Interface: ***Congratulations on the publication of this monograph. It is expected to fill a gap, certainly in The Electrochemical Society Monograph Series, as well as in the list of publications from Wiley. How is this book different from the first edition?***

Bagotsky: The first edition of the book (Plenum Press 1993) covered the state of the art in electrochemistry up to the 1960s, but did not reflect more recent developments. For instance, there was a lack of discussion on the increased use of different physical experimental methods for the investigation of electrode surfaces. In the second edition, I included many new chapters on the most recent developments (electrocatalysis, solid-state electrochemistry, nanoelectrochemistry, conducting polymers, physical methods), some of which were written by leading experts in the corresponding fields.

Interface: ***Who will benefit from this book?***

Bagotsky: I think that this book can be useful not only for students in electrochemistry and for people already working in this field; but also for people working in other fields (biology, catalysis, solid-state science) who often encounter electrochemical problems.

Interface: ***You graduated from high school in Switzerland; did you grow up in Bern? When and how did you start to take an interest in science?***

Bagotsky: I was born (1920) and went to school in Bern (Switzerland) where my father worked as a permanent representative of the Red Cross of the USSR at the International Committee of the Red Cross. At the age of 16-17 I became interested in chemistry. After our family returned in 1938 to Russia, I began my studies in the chemistry department of Moscow State University.

Interface: ***You received your first degree in 1944 in chemistry from Moscow State University. You went on to receive your PhD in theoretical electrochemistry (1947) from Moscow State University, under Alexander Frumkin. What kind of person was Frumkin? What kind of influence did he have on your studies?***

Bagotsky: In 1943, I met for the first time the head of the university's electrochemical chair — Professor Alexander N. Frumkin. This was decisive for my future career. Frumkin became my first and main teacher; and I worked with him until his death in 1976. He was not only a prominent and outstanding scientist in many branches of physical chemistry; but he also had a profound knowledge of English, French, Russian, and German art and literature.

At that time the most notable event in electrochemistry was the beginning of the development of electrochemical kinetics. In 1952, Frumkin and I wrote together, with other students of his, the first monograph on this subject.

Interface: ***In 1950, you became a senior scientist for the Moscow Power Sources Institute and head of the department for new battery systems. What kind of systems was the department working on at that time?***

Bagotsky: At the Moscow Power Sources Institute, I was working on different battery systems (mercury-zinc and magnesium batteries). The main job was the development of silver-zinc batteries for ICBMs, sputniks, and other spacecraft.

Interface: ***You earned a doctorate of Technical Sciences in Electrochemical Energy Conversion, from the Moscow Power Sources Institute, in 1959. Soon after (1960), you became the Deputy Chairman of the National Scientific Council for Fuel Cells, USSR Academy of Sciences. How did fuel cells change from that point until you left the Council in 1985?***

Bagotsky: When I was working at the Scientific Council for Fuel Cells, the main goal of the investigations were fuel cells with alkaline electrolytes and high

(continued on page 78)

Fundamentals of Electrochemistry
(continued from page 8)

temperature cells with molten and/or solid oxide electrolytes. The development of modern PEMFCs began in Russia only after 1985.

Interface: ***You were awarded a degree of professor in theoretical and applied electrochemistry in 1965 from the Institute of Electrochemistry, Russian Academy of Sciences. In 1985, you became head of the department for energy conversion and electrochemical devices at the Frumkin Institute of Electrochemistry, Russian Academy of Sciences (Moscow). You held that position, along with that of principal scientist, until 1998. What were some of the department's activities?***

Bagotsky: During the period 1965-1985, my main field of interest was the investigation of different problems in electrocatalysis, for example, problems connected with the reactions of oxygen reduction and methanol oxidation. My department was also engaged in extensive studies in the field of organic electrochemistry, such as reactions of electrochemical hydrodimerization.

Interface: ***What advice do you have for students (in Russia, or anywhere) wanting to study electrochemistry?***

Bagotsky: In order to correctly interpret complex electrochemical phenomena, it is very important to have a clear understanding of the physical meanings of all basic electrochemical laws.

Interface: ***Currently, you are living in the United States and have family here. Is anyone else in your family involved in scientific endeavors? Do you get back to Russia (and/or Switzerland) at all?***

Bagotsky: My wife, Irina Yablokova, was also involved in the research of processes in silver-zinc batteries for space applications. My children and grandchildren have chosen another field — they are software engineers. Of course I would be very glad to visit Russia once more, where I have many family members; but due to my age and health reasons, such a possibility is very doubtful.

Interface: ***You have had a long career in electrochemistry; what do you think is the biggest challenge in the field today?***

Bagotsky: The biggest challenge in electrochemistry was, and remains, the development of fuel cells. Today the biggest challenge is a drastic increase of the efficiency of the electrochemical reactions of oxygen reduction and of oxidation of organic fuels. ■

Section News
(continued from page 69)

sulfur battery technology. Lithium sulfur batteries hold great promise to be among the next generation of secondary batteries.

San Francisco

The San Francisco Section had a meeting this past October in Santa Clara, California. The speaker was D. Noel Buckley, chair of Physics at the Univ. of Limerick, Ireland, and a vice-president of ECS. Prof. Buckley first talked about the state of ECS. He gave some statistics about the 18 Sections and the 14 Divisions. He also talked about the growth of ECS overseas, the centennial campaign, and the long range planning activities.

Prof. Buckley gave a presentation, "Anodic Behavior of InP an GaN: Film Growth, Etching, Nanoporosity, and Current Oscillations." Because compound semiconductors such as GaN or InP lack a good thermal oxide surface layer, they have to be passivated, usually by anodization. The anodization of InP in aqueous $(NH_4)_2S$ and KOH was studied with electrochemical method, as well as TEM, AFM, and SEM imaging.

Spontaneous current oscillations were observed during anodization of InP in aqueous $(NH_4)_2S$. Remarkably, the charge per cycle was constant. More complex oscillatory behavior was observed in KOH electrolytes. Porous InP of columnar shape was observed in sulfide solution. A porous inverted pyramidal shaped structure was observed in a KOH solution. Most of these phenomena are now understood. The photoelectrochemical (PEC) etching characteristics of n-GaN were also discussed and a model was proposed to explain the concentration dependence of the etch rate.

There were many questions from the audience after the talk. The audience greatly appreciated Prof. Buckley making the trip to the San Francisco bay area to give this talk. ■