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JES Focus Issue in Recognition of Adam Heller and His Enduring Contributions to Electrochemistry

In Recognition of Adam Heller and His Enduring Contributions to Electrochemistry

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Recent progress in diverse scientific fields ranging from bioelectrochemistry to battery technology to photoconversion has been deeply influenced by the contributions of Professor Adam Heller of the University of Texas at Austin to electrochemistry and materials science. This focus issue recognizes Prof. Heller's career and works on the occasion of his 80th birthday. It grew from a special symposium in Heller's honor at the 224th Meeting of ECS in San Francisco in the fall of 2013.

A lifelong inventor, Adam Heller discovered neodymium liquid lasers in the 1960's.[1,2] He co-created the lithium thionyl chloride battery, reported in the *Journal of The Electrochemical Society* in 1973,[3] which remains a dominant battery technology in terms of energy density and temperature range. He advanced the field of photoelectrochemistry, including high-efficiency liquid junction solar cells for electricity and hydrogen production,[4,5] and photocatalytic oxidation, such as air and surface decontamination by TiO_2.[6] Most recently, his innovative designs for glucose biosensors, based on "wired" enzyme electrodes, have simplified and automated glucose monitoring technology, revolutionizing diabetes care.[7,8]

This focus issue spans twenty contributed articles, and highlights Dr. Heller's contributions in bioelectrochemistry and photoelectrochemistry. Several papers consider interactions of enzymes with redox polymers and with nanoscale structures for electron transfer reactions, applicable to sensors, energy conversion, and chemical conversion. Two papers cover materials aspect of solar energy conversion, including an in-depth review of photostability of photoelectrochemical cells. Other papers take Heller's ideas in new directions, including an electroosmotic pump based on redox polymers, insect communication powered by implanted biofuel cells, and three papers on microbial fuel cells, applying Heller's ideas on mediated electron transfer to "living bioelectrocatalysts." The editors thank all authors, reviewers, and journal staff for their efforts to honor Dr. Heller's achievements.

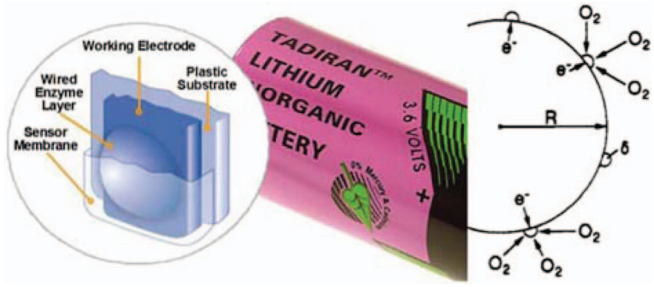

Figure 1. Examples of Adam Heller's influence and innovations (left to right): Glucose biosensor detail (credit: Abbott Diabetes Care); Lithium thionyl chloride battery (credit: Tadiran Batteries); Model for oxygen reduction by fast electrons.[9]

Adam Heller

In closing, it is fitting to remark on the seven nations represented by the contributors to this focus issue. Considering the range of nationalities reflected by the contributors to the San Francisco session, Heller observed:

"It's unbelievably important – and perhaps the most important thing – that we in this room, are speaking twelve different mother tongues . . . Suddenly it comes to your mind that science has not only created a community of the people that are leading the world, the cutting edge of what makes people move forward. But not in the sense of the technology only, but that we are the exemplary group of people able to work with each other, love each other, and be very good friends with each other. So, I cannot thank you more, and more deeply, for your friendship."

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