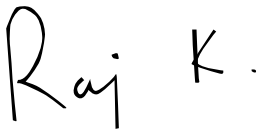
Pushing Electrons (and Sometimes Ions or Molecules)

Our Society draws from a community of scientists and engineers with a wide spectrum of technical backgrounds and research interests. Nonetheless, a common thread weaves through the Society membership in that the vast majority of us study electron transport or its many manifestations. Thus microelectronic devices, batteries, fuel cells, light-emitting diodes, water electrolyzers, and solar cells all crucially depend on electron transfer for their function. Electron transfer underpins corrosion. Our colleagues in the DS&T and HTM Divisions perhaps are the farthest removed from the business of pushing electrons. Yet they also deal with electron transfer issues within the context of charge storage and thermal stability respectively. Clearly, fundamental understanding and control of electron transfer processes lie at the core of electrochemical and solid-state state science/technology, regardless of the particular sub-discipline.

Ion transport often occurs in concert with electron transfer. In the photosynthetic reaction center, electron transfer triggers a proton pump to produce ATP and transduction of energy. Rapid and concerted shift of protons between neighboring base pairs is believed to play a key role in electron transport through DNA arrays. Driving the movement of ions and molecules with an electric field is of great practical significance in a variety of scenarios ranging from chemical analysis (capillary electrophoresis) to medicine (drug delivery).

Electron transfer was long known to be ubiquitous in physical and chemical systems; only recently have we begun to truly appreciate its importance in biological systems and processes. To the aforementioned examples of biological significance may be added the important issue of long-distance electron transfer—that is, electron transport across insulating or molecular spacers. Many recent studies have focused on the theoretical aspects and experimental measurements of the distance dependence of electron transfer rates. Self-assembled monolayers on metal or semiconductor electrodes, dissolved electron donors and acceptors linked by spacers, natural and modified proteins, and synthetic peptides have all been examined from this perspective.

This issue of the magazine, which features the Organic and Biological Electrochemistry (OBE) Division, focuses on electron transfer in organic and biological systems. The three feature articles in this issue underline the continued vitality and centrality of electron transfer research. A bonus feature by Vittorio de Nora on the development of electrode materials for aluminum production is also included in this volume. Paul Kohl's help with the processing of this manuscript for publication is much appreciated. Stay tuned.



Krishnan Rajeshwar
Editor

The Electrochemical Society ***Interface*** (USPS 010-327) (ISSN 1064-8208) is published quarterly by The Electrochemical Society, Inc., at 65 South Main Street, Pennington, NJ 08534-2839 USA. Subscription to members as part of membership service; subscription to nonmembers $40.00 plus $5.00 for postage outside U.S. Single copies $5.00 to members; $10.00 to nonmembers. Periodicals postage at Pennington, New Jersey, and at additional mailing offices. POSTMASTER: Send address changes to The Electrochemical Society, Inc., 65 South Main Street, Pennington, NJ 08534-2839.

The Electrochemical Society is an educational, nonprofit 501(c)(3) organization with more than 7000 scientists and engineers in over 70 countries worldwide who hold individual membership. Founded in 1902, the Society has a long tradition in advancing the theory and practice of electrochemical and solid-state science by dissemination of information through its publications and international meetings.

The Electrochemical Society
INTERFACE

Published by:
The Electrochemical Society, Inc.
65 South Main Street
Pennington, NJ 08534-2839 USA
Tel 609.737.1902
Fax 609.737.2743
Web: www.electrochem.org

Editor: Krishnan Rajeshwar
e-mail: rajeshwar@uta.edu

Guest Editor: Jean Lessard
Contributing Editor: Mike Kelly

Managing Editor: Mary E. Yess
e-mail: mary.yess@electrochem.org

Production & Advertising Manager: Ellen S. Popkin
e-mail: interface@electrochem.org

PRODUCTION NOTES
Design Consultant:
O&Y Design,
Trenton, NJ

Printed by:
Cummings Printing Co.
Hooksett, NH