



Environmental Concerns

Since the 1970s, environmental awareness has grown dramatically in response to major air pollution and water quality problems throughout the world. Environmental science and technology must be interdisciplinary in order to solve complex problems of pollution prevention and remediation. Electrochemical and solid-state technologies play a key role in the detection, analysis, and abatement of pollutants. However, electrochemical technology, such as the chlor-alkali and batteries industries, have also contributed to environmental problems.

As an educator, I have observed an increasing demand from students for environmentally-related courses. In response to this, last quarter I revamped my graduate course on electrochemistry and electrochemical engineering into environmental electrochemistry. Recently, several books (although not really textbooks) have been published on the topic of environmental electrochemistry, which makes teaching such a class easier.

In our Senior-level process design lab, our chemical engineering undergraduates design, build, and operate bench-scale experiments. Even when I am not teaching the class, I usually volunteer to direct one or two lab groups and use this opportunity to teach electrochemical engineering. The students learn electrochemistry by hands-on experience with potentiostats, multimeters, reference electrodes, and ion-exchange membranes. During the past several years, the majority of the projects have been environmentally-related. This was not planned, but occurred more because of the interests of the faculty and students. The electrochemical engineering projects have included electrowinning of copper, oxidation of phenol, electrokinetic remediation of metals from sand, and a hydrazine-air fuel cell. The students learn not only about design, kinetics, mass transfer, fluid flow, and scale-up of their processes, but about electrochemistry, materials selection, power requirements, and gas evolution.

The feature articles in this issue are from the IE&EE Division and they focus on electrochemical engineering and the environmental impact of these technologies. Although none of the "E"s in the IE&EE Division's name stands for "Environmental" (the initials stand for Industrial Electrolysis & Electrochemical Engineering), environmental issues are a concern and a common symposium topic for this Division as well as others in ECS.

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Editor

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