Biomedical Engineering

Lecture Series Seminar

Chemical Sensors Based on Spectroelectrochemistry

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1:00 PM-2:00 PM, November 12th, 2010
Location: EC 2300

Abstract: A novel sensor that combines electrochemistry, spectroscopy, and selective partitioning into a film has been developed. The sensor consists of an optically transparent electrode (OTE) coated with a selective film. Sensing is based on the change in optical signal for attenuated total reflectance at the OTE that accompanies electrochemical modulation of analyte that has partitioned into the film. Selectivity for the analyte relative to other solution components is obtained by choice of film material, electrolysis potential, and wavelength for optical monitoring. Both visible absorbance and fluorescence modes of detection have been demonstrated. The sensor shows excellent selectivity for applications that involve complex samples. An example is the determination of ferrocyanide in a sample of nuclear waste.

William Heineman is Distinguished Research Professor in the Department of Chemistry at the University of Cincinnati. He received a B.S. degree in Chemistry from Texas Tech University in 1964 and a Ph.D. in 1968 from the University of North Carolina at Chapel Hill. He was a Research Chemist at Hercules Research Center for two years before becoming a Postdoctoral Research Associate at Case Western Reserve University and then at The Ohio State University. His research interests include spectroelectrochemistry, electrochemical immunoassay, sensors, and microchip capillary electrophoresis. He has published over 400 research papers. His awards include the Charles N. Reilley Award in Electroanalytical Chemistry, the Torbern Bergman Medal from the Analytical Section of the Swedish Chemical Society, the ACS Division of Analytical Chemistry Award for Excellence in Teaching, the Fields of Analytical Chemistry Award from the Eastern Analytical Symposium, the Outstanding Achievement Award of the Sensors Division of the Electrochemical Society, and Fellow of the ACS.