

The Application of Capillary and Microfluidic Electrophoresis to Problems in Toxicological and Forensic Analysis

Prof. Bruce McCord
Professor

Department of Chemistry and Biochemistry
Florida International University

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LECTURE: 12:45 PM - 1:45 PM

ENGINEERING CENTER

ROOM EC 2300

10555 WEST FLAGLER STREET

MIAMI, FL 33174



Abstract: Capillary electrophoresis involves the movement of charged molecules under the influence of applied electric fields. Low volume samples are separated in 50-100 μm fluidic channels using voltages as high as 30kV . The result is a rapid and highly efficient separation that has revolutionized a number of fields by permitting large scale genotyping, high resolution bioseparations, and forensic analysis.

In our research group we are interested in the application of these systems towards problems in forensic and toxicological analysis. In particular we have been exploring the ways that separation chemistry can be combined with microscale fluidic systems to achieve high resolution and sensitive detection of analytes of importance to criminal investigation such as toxicological samples, explosives and DNA. Approaches developed in our lab include applications of pseudo stationary phases, guest/host complexes, and porous monolithic polymers to separate small molecules and entangled polymer linear polymers for DNA separations. A number of these projects will be reviewed in this presentation and the talk will conclude with a discussion of future trends in this rapidly evolving field.

Biography: Bruce R. McCord is a Professor of Analytical and Forensic Chemistry at Florida International University. He joined the faculty at FIU in the fall of 2004. Prior to moving to Florida Dr. McCord was the director of the forensic chemistry program at Ohio University. He also served for 9 years as a researcher for the FBI's Forensic Science Research and Training Center in Quantico Virginia.

His research interests involve development of liquid based separation methods in chromatography and their forensic applications. This includes forensic genetic analysis, toxicology, and explosives residue detection. Dr. McCord received a BS in Chemistry with Honors from the College of William and Mary in 1981, and a Ph. D. in Analytical Chemistry from the University of Wisconsin-Madison in 1986. Dr. McCord's research has been supported by the National Institute of Justice, the National Science Foundation, DHS, and the Technical Services Working Group. He has published over 60 peer reviewed papers and 7 book chapters. He is a member of the editorial boards of Electrophoresis and The Journal of Forensic Sciences and was the 2008 winner of the Paul Kirk Award of the Criminalistic Section of the American Academy of Forensic Sciences.

Contact: bmeinfo@fiu.edu; 305-348-6717

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