Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

An Optical Biosensing Platform using Reprecipitated Polyaniline Microparticles[1] LOUIS NEMZER, ARTHUR EPSTEIN, Ohio State University — A great deal of effort remains focused on the goal of developing a continuous *in vivo* glucose monitoring system for patients with *diabetes mellitus.* We report a proof-of-concept study on a reagentless optical biosensing platform that circumvents the problems usually associated with direct glucose detection by utilizing the UV-VIS absorption properties of polyaniline, a biocompatible polymer. When the enzyme glucose oxidase is entrapped within reprecipitated polyaniline microparticles, a glucose molecule readily donates two protons and two electrons to the polyaniline, reversibly altering the polymer's oxidation state. The resultant change can be monitored by measuring the absorption at wavelengths that fall within the "optical window" for skin. The micro-structured morphology also insures a high surface-area to volume ratio. Data from *in vitro* prototype devices indicate that in the low enzyme-loading regime, the response can be fit to the Michaelis-Menten model for enzyme kinetics, but at higher enzyme loading, diffusion effects dominate. As a biosensing platform, the system also has the potential to be adapted to detect other biologically relevant analytes, including cholesterol and ethanol.

[1]The authors deeply appreciate the help of Nan-Rong Chiou and the support from the NSF under IGERT (0221678) and NSEC (EEC-0425626)

Louis Nemzer
Ohio State University

Date submitted: 20 Nov 2008 Electronic form version 1.4