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Evaluation of optical excitation conditions for ruthenium complex for biosensor optodes SEAN PIEPER, Elec. and Comp. Engr. Dept. CSU, ZHONG ZHONG, Chemical Engineering Dept. CSU, KEVIN L. LEAR, Elec. and Comp. Engr. Dept. CSU, KEN REARDON, Chemical Engineering Dept. CSU — Development of a fiber optic biosensor incorporating genetically engineered enzymes which catalyze chlorinated ethenes in an oxygen-consuming reaction for in situ monitoring of groundwater contaminants motivates optimization of optode excitation conditions. These conditions affect the sensitivity, signal-to-noise, and optode service life impacting the quality of the overall biosensor. Optodes are generally comprised of a fluorophore conjugated with a polymer as a substrate cross linked at the distal end of a fiber optic. We investigate the excitation conditions of tris(4,7-diphenyl-1,10-phenanthroline) ruthenium(II) chloride (Ru(dpp)3) conjugated with poly(vinyl alcohol) (PVOH) as an optode. A reported advantage of Ru(dpp)3 is that it has no emission spectral shift occurring under varying chemical and environmental conditions. Photostability degradation due to photobleaching of Ru(dpp)3 with PVOH as a substrate is explored by varying the optical irradiance of the fluorophore containing optode. Other issues relating to practical implementation of Ru(dpp)3 as oxygen sensitive biosensors will be discussed.

Sean Pieper
Elec. and Comp. Engr. Dept. CSU

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