

Abstract Submitted
for the OSS10 Meeting of
The American Physical Society

Investigation of the Quenching Mechanism of a Fluorescence Process YI WANG, DEBRA EGOLF, DENNIS KUHL, Marietta College — The properties and behavior of an electronic excited state were investigated experimentally. The goal was to determine whether, upon interaction with a series of molecules Q, (i.e., 1,2,4-trimethoxybenzene, 1,4-dimethoxybenzene, naphthalene), the fluorescent states of 9,10-dicyanoanthracene and 9-cyanoanthracene are quenched via an electron transfer process. A Stern-Volmer investigation enables evaluation of the rate constant, k_q , for quenching of the cyanoanthracene excited state. Then a Rehm-Weller plot of k_q vs. Gibbs energy of electron transfer, ΔG_{et} , allows determination of the Gibbs energy of activation, ΔG_{et}^\ddagger , and the rate constant, k_{et} , for the electron transfer process. UV-visible and fluorescence spectroscopy, cyclic voltammetry, laser-based kinetic analyses, and computer modeling were used in this investigation. Now that the electron transfer process previously reported for these chemical systems has been validated using our methods, future investigations will involve manipulation of various experimental parameters (i.e., anthracene substituents, solvent polarity, etc.).

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Date submitted: 02 Apr 2010

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