

**FLUORESCENCE DECAY STUDY OF ANISOTROPIC ROTATIONS OF
SUBSTITUTED PYRENES PHYSISORBED OR CHEMICALLY
ATTACHED TO CAB-O-SIL SURFACES**

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Optical polarization spectroscopy has been used to investigate molecular dynamics of fluorescent probes 1-pyrenebutanol and 1-pyrenebutyric acid at the solid/air interface of cab-o-sil (a highly pure form of silica). Pyrenebutanol was chemically attached to the surface of cab-o-sil through the siloxy bond while pyrenebutyric acid was physisorbed on the surface via an adsorption process. Dynamics of fluorescence depolarization for both molecules was studied under steady state and time resolved conditions. Low and high loadings of the probe molecules were used in our studies to probe the dynamics of excimer formation. Our data indicates that excimer formation is static in nature and does not involve a dynamic process. Fluorescence lifetimes were dependent on the concentration of the probe molecule and became shorter at higher surface loadings for both the chemically attached and physisorbed probes. The fast rise of anisotropy (almost within the duration of the laser pulse) was followed by a decay with a lifetime of 210 ns for the physisorbed probe. For the chemically attached probe, on the other hand, a slower rise of anisotropy (~35 ns) was followed by a decay with a lifetime of 1.5 us. We will discuss the dynamics of molecular motion for the chemically attached and physically adsorbed probes on cab-o-sil surface.

Research sponsored by the Division of Chemical Sciences, Geosciences, and Biosciences, Office of Basic Energy Sciences, U.S. Department of Energy, under contract DE-AC05-00OR22725 with Oak Ridge National Laboratory, managed and operated by UT-Battelle, LLC.

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