Fluorescence decay studies of anisotropic rotations of PyButO- probe (chemisorbed and physically adsorbed) on the surface of Cabosil in solvent free environment.

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Optical polarization spectroscopy has been used in the investigation of molecular dynamic of a fluorescent probe (PyBut) in the heterogeneous environment of silica gel in the absence of solvent and oxygen. PyBut was either chemically attached through siloxy bond or physically adsorbed in the form of $Py(CH_2)_3COOH$ to the surface of Cab-o-sil and the dynamics of fluorescence depolarizations were followed in the steady state and time resolved modes. Low and high loading of the probe were used in the study and allowed us to propose that the probe excimer forms from ground state aggregate (dimeric form of the probe), possibly by slight displacement of ground state Probe-Probe complex, rather than through a dynamic mechanism. Probe lifetime was a function of probe's concentration and was shorter for the high loading for all the chemically attached and physisorbed samples . The fast rise of anisotropy (almost within the laser pulse) was followed by a decay with a lifetime of 210 ns for the physisorbed probe, while for the chemically attached probe a slower (-35 ns) rise of anisotropy was observed with a decay lifetime of 1.5 µs. We will discuss the dynamics of molecular motion for chemically and physically adsorbed probe.

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