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Hydration Dependence of Energy Relaxation Time for Cytochrome C SHUJI YE, JING-YIN CHEN, JOSEPH R. KNAB, ANDREA MARKELZ, Physics, University at Buffalo, SUNY — Hydration plays a critical role in protein dynamics. Here we consider the effects of hydration on energy relaxation for an electronically excited heme protein cytochrome c. We measure the hydration dependence of energy relaxation time of cytochrome C films after photoexcitation in the Soret regionusing two-color pump/probe time resolved transmission measurements. Thin films were prepared from cytochrome C/ Trizma buffer solutions and mounted in a hydration controlled cell. We used 400nm ($\sim$3 mW) to pump the B band and 800 nm ($\sim$1 mW) to probe the III band. The III band corresponds to the charge-transfer transition between heme π and iron d orbital, and is assigned to the ground electronic state of the heme. Therefore this band can be used to probe the ground state population. Three separate dynamic components were observed: a very fast transient $\tau_1 \sim 200$ fs; a several hundred femtosecond component (τ_2); and a recovery of the ground state absorption(τ_3). We find τ_3 apparently decreases with decreasing hydration while τ_1 and τ_2 are independent of hydration.

Andrea Markelz
Physics, University at Buffalo, SUNY

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