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Infrared Electro-Optic Response of TIPS-Pentacene Thin Film Field Effect Transistors[1] E.G. BITTLE, J.W. BRILL, J.E. ANTHONY, University of Kentucky — We have used tunable infrared diode lasers to measure changes in the reflectance of bis-triisopropylsilylethynyl (TIPS) pentacene crystals, solution cast on different dielectrics, when voltages are applied to the FET gates. Relative changes in reflectance as large as 0.05% are observed and can be characterized in terms of "up-shifts" of TIPS-pentacene phonon frequencies as well as broadband changes in reflectance with application of gate voltage. The relative changes vary either linearly or quadratically with gate voltage, depending on the crystal thickness. With application of a drain current, the relative change in reflectance (for thick crystals) varies linearly with position between the source and drain electrodes, indicating that the optical changes are due to the local gate electric field. For thin crystals, the electro-optic response is sluggish, taking $\sim$ 1ms to develop.

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