Public Abstract
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Title: Pressure Dependence of the Luminescence and Raman Modes in Polyfluorene

I present a study of the optical properties of poly-para-phenylene and three different side-chain substituted polyfluorene polymers. Each of the different side-chain substitutions directly affects morphology of the polymer, the defect concentration, and the bulk optical and physical properties inherent to the material.

I present an analysis of the Raman spectra under hydrostatic pressures for three *oligo*(*para*-phenylene) materials (*p*-terphenyl, 3P; *p*-quaterphenyl, 4P; and *p*-hexaphenyl, 6P) under hydrostatic pressure up to 80 kbar, with a focus on the 15-25 kbar region where the molecules are known to be forced into a more planar state.

I present studies of the photoluminescence (PL) and Raman modes of polyfluorene (PF2/6) under hydrostatic pressures of 0-120 kbar at room temperature. The distinct PL with associated vibronics observed at atmospheric pressure blue shifts and changes dramatically around 20 kbar, above this pressure a broad peak at about 2.3 eV, associated with the keto defect, begins to dominate the PL. Raman modes observed are the 1417 cm^{-1} mode from the C-C stretch within the monomer, the 1342 cm^{-1} and 1290 cm^{-1} modes from phenyl rings connecting the monomer units, and the 1600 cm^{-1} modes from the intra-ring C-C stretch. All Raman modes analyzed shift to higher energies with pressure. Some of the phonon lines exhibit an antiresonance effect at higher pressures that is indicative of a high electron phonon interaction between the Raman phonons and the (real) PL transitions.