

Abstract Submitted
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Tuning intermolecular interactions in di-octyl substituted polyfluorene via hydrostatic pressure KESHAB PAUDEL, HARRISON KNOLL, MEERA CHANDRASEKHAR, SUCHI GUHA, Univ. of MO, Columbia — Polyfluorenes (PFs), a class of poly para-phenylene based blue-emitting polymers, present intriguing structure-property relationships. The backbone conformations of dioctyl-substituted PF (PF8) depend on the torsion angle between monomers. We present photoluminescence (PL) and Raman studies of thin films, as-is bulk, and thermally annealed bulk samples of PF8 under hydrostatic pressure (0-6.5 GPa). The PL energies red-shift at different rates; their pressure coefficients elucidate the role of the backbone torsion angle. In the annealed sample the change in the torsion angle under pressure as the polymer evolves from a non-planar C_α conformer to a planar C_β conformer causes a faster red-shift. Density-functional calculations of a fluorene oligomer corroborate this trend. Raman peaks harden with pressure; the intra-ring C-C stretch frequency at 1600 cm^{-1} shifts at a rate of $7.2\text{ cm}^{-1}/\text{GPa}$ and exhibits asymmetric line shapes at higher pressures, characteristic of a strong electron-phonon interaction.

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