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Tuning optical properties of blue-emitting polyfluorenes via hydrostatic pressure KESHAB PAUDEL, MEERA CHANDRASEKHAR, SUCHI GUHA, Department of Physics and Astronomy, University of Missouri- Columbia, MO 65211 — Polyfluorenes (PFs) represent a unique class of poly para- phenylene based blue-emitting polymers with intriguing structure-property relationships. Slight variations in the choice of functionalizing side chains result in dramatic differences in the inter- and intra-chain structures in PFs. Highlighting these differences are two prototypical PFs, poly (9,9-(di n, n-octyl) fluorene) (PF8) and poly (9,9-(di ethyl- hexyl) fluorene) (PF2/6). In addition to the nematic liquid crystal (n-LC) mesophase, PF8 is characterized by at least five structural phases. We present photoluminescence (PL) and Raman scattering studies of powder samples and thin films of PF8 under hydrostatic pressure. The powder sample was thermally annealed at 2GPa. The PL vibronics of the as-is powder sample red-shift at an average rate of 30 meV/GPa whereas the thermally annealed sample red-shifts at a higher rate of 50 meV/GPa, indicating a different crystalline mesophase for the annealed sample. The Huang-Rhys factor is found to increase with increasing pressures signaling a higher geometric relaxation of the electronic states. The Raman peaks harden with increasing pressures; the intra-ring C-C stretch frequency at 1600 cm $^{-1}$ has a pressure coefficient of 5 cm^{-1}/GPa and exhibits asymmetric line shapes at higher pressures.

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