Measuring structural inhomogeneity of a helical conjugated polymer at high pressure and temperature

We report on X-ray scattering measurements of helical poly[9,9-bis(2-ethylhexyl)-fluorene-2,7-diyl] by mapping the sample with 10μm spatial resolution from 0.3 GPa to 36 GPa. We follow the strongest 00/reflection, which moves toward higher scattering angles with pressure indicating planarization of helical polyfluorene. Lateral inhomogeneity is increased for >10 GPa concomitant with the solidification of the pressure transmitting medium (a 4:1 mixture of methanol and ethanol). We also follow the 00/reflection with increasing temperature at the constant pressure of 4.3 GPa in neon. We observe a sharp shift toward higher scattering angles indicative of a phase transition at 167–176 °C.