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Thermotropic Liquid Crystalline Phases in α,α'-dioctyl Pentathienoacene[1] CHARLES SHAW, Macromolecular Science & Engineering Program, XINNAN ZHANG, Department of Chemistry, ADAM MATZGER, Department of Chemistry, Macromolecular Science & Engineering Program, DAVID MARTIN, Department of Materials Science & Engineering, Macromolecular Science & Engineering Program — Solution cast thin films of α,α'-dioctyl pentathienoacene were studied using differential scanning calorimetry (DSC), hot-stage optical microscopy and hot-stage x-ray diffraction. DSC experiments indicate four thermotropic phase transitions in the temperature range of 100 °C–180 °C. Hot-stage optical microscopy experiments show these films to be birefringent and fluid at temperatures corresponding to two of these phases. At temperatures above the last transition, the films lose all birefringence. Hot-stage x-ray diffraction of these films indicates the presence of periodic packing of these molecules into planes parallel to the substrate surface. The evidence for regular packing disappears as the films are heated into the second of these phases. These data indicate that these films progress from a crystalline phase, to a smectic phase, to a nematic phase, and finally to an isotropic liquid phase as the films are heated.

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