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Thermally-Induced Mesophase Transitions in Alkyl-Substituted Thienoacenes[1] CHARLES M. SHAW, XINNAN ZHANG, National Starch, LIDARIS SAN MIGUEL RIVERA, Dow Chemical, GEETHA G. NAIR, Centre for Liquid Crystal Research, Bangalore, India, ANTAL JAKLI, Kent State University, ADAM J. MATZGER, DAVID C. MARTIN, University of Michigan — Pentathienoacene (T_5) is an organic molecule—first synthesized in recent years—that is most succinctly described as the thiophene analog of pentacene. In this study, the solid-state structure and phase behavior of dioctyl- and didodecyl-substituted T_5 were examined *via* differential scanning calorimetry (DSC), variable-temperature, polarized optical microscopy (VT-POM), variable-temperature X-ray diffraction (VT-XRD) and electron diffraction (ED). DSC reveals the presence of a number of phase transitions, while ED, VT-OM and VT-XRD reveal the details of the structural changes of these transitions. The first phase transition exhibited by both materials is a crystal–crystal transformation that involves the contraction of the unit cell along the long axis by nearly 25%. This change has been attributed to the introduction of numerous gauche defects at elevated temperatures. Further heating causes both molecules to exhibit a Smectic C liquid crystalline phase, identified by VT-OM and VT-XRD. VT-XRD was also utilized to elucidate lattice parameters for these various phases.

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