

A Systematic Study of the Physical and Structural Properties of Smectogenic 2,7-Fluorenes

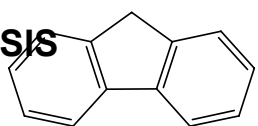
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RATIONALE

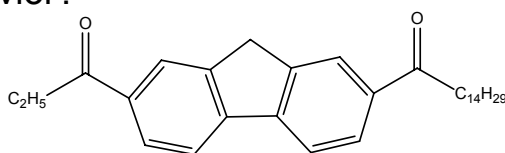
Applications of liquid crystals are important and diverse in display technology. A library of smectogenic 2,7-disubstituted fluorenes with the same molecular formula weight and length are being prepared and studied to investigate how very subtle molecular structural changes affect thermal and optical properties. Members differ in their molecular structure by the asymmetry of the terminal substituents. The figure below shows how the central fluorene core is moved to one side or the other while keeping the overall molecular length constant.

Previous work established the thermal properties shown in the figure for 0 to 10 asymmetry. The T range of mesogen existence appears to be decreasing as the asymmetry increases, that is, as the difference in the terminal chains increases. The question of the summer was would a 15,3 homolog, asymmetry 12 exhibit any mesogenic behavior?

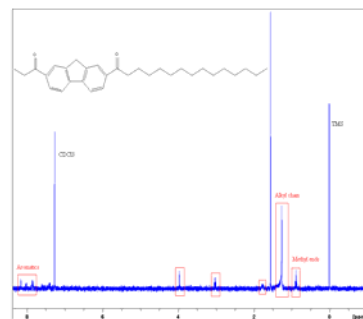
SYNTHESIS



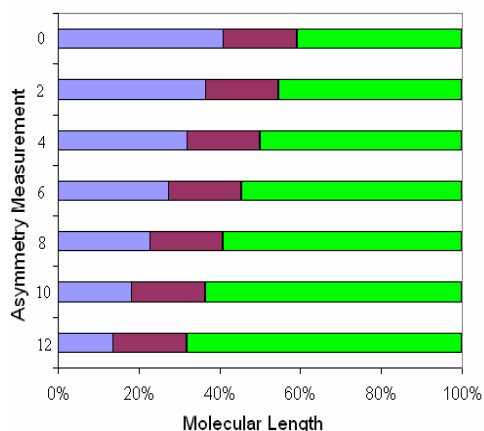
1. R1COCl, AlCl3, CH2Cl2
2. R2COCl, AlCl3, CH2Cl2
3. Purification



Product believed to be 15,3 homolog was obtained. Its NMR spectrum is on the right and is consistent with the expected structure. Differential scanning calorimetry suggests the existence of two crystals forms but microscopy does not suggest any mesogenic behavior.



Variation in fluorene core



Thermal existence ranges for smectic mesogenic phases

