Synthesis of Novel Polycyclic Aromatic Hydrocarbons Derived from Benzotriphenylene

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The objective of this research is the synthesis of a series of novel dibenz[a,c]anthracenes and to probe their liquid crystalline properties, as well as their organization in the solid state. We have successfully developed a synthetic approach to this class of compounds using Suzuki cross-coupling and oxidative cyclization as the key steps.



Surprisingly, the parent compounds do not exhibit any liquid crystalline phases, despite structural similarities with known liquid crystalline compounds. However, the introduction of substituents in the 10- or 13postions produces compounds that exhibit columnar hexagonal liquid crystalline phases over very broad temperature ranges. Moreover, the liquid crystalline temperature range is very sensitive to the type of substituents. Ongoing efforts focus on:

1. Understanding how the substituents in the 10 and 13 positions affect liquid crystalline properties, and

2. Expanding the synthetic approach to vary the substitution pattern and explore the properties of the resulting compounds.



Polarized optical micrograph and schematic representation of a columnar hexagonal mesophase.