**Synthesis and properties of asymmetric dimeric materials with lateral and terminal fluorine substituents for dual frequency liquid crystal mixtures**

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Nematic liquid crystals have been widely used in electro-optical devices due to the ability to switch the orientation of materials using an external electric field. While the switch-on response time can be decreased by increasing the electric field, the switch-off relaxation process is much slower as it is controlled by surface anchoring energy.\[1\]

With the continuing requirement for faster switching times and alternative route can be found in dual frequency liquid crystal materials (DFLCs). Usually DFLC materials are a two component mixture, positive compounds with a positive dielectric anisotropy that decreases at higher frequencies and negative compounds with a large negative dielectric anisotropy that remains almost constant across different frequencies.\[1\]

A liquid crystal dimer is a material with two mesogenic core units separated by a flexible spacer, usually alkyl chains. Dimers have been the target of a great deal of research due to the unusual liquid crystal behaviour they exhibit.\[2\]

A series of asymmetric dimeric materials have been targeted, these feature one core unit with lateral fluorine substituents and the other core with terminal fluorination. The aim is to synthesise materials with one core contributing to positive dielectric anisotropy and the other negative dielectric anisotropy.

![Image of fluorinated dimer structure](image)

The synthesis of a series of fluorinated dimers is described. With the mesomorphic properties characterised by optical polarising microscopy (OPM) and differential scanning calorimetry (DSC).

**References:**


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