

The twist-bend nematic phase

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Liquid crystal dimers consist of molecules containing two mesogenic units linked by a flexible spacer and have been a rich source for the discovery of new types of mesophases. [1] Most recently, a nematic-nematic transition was reported for odd-members of the α,ω -bis-4-(4'-cyanobiphenyl)alkanes. [2,3] Cestari *et al.* assigned the lower temperature nematic as a twist-bend nematic phase, N_{TB} . [2] This was later confirmed in studies based on freeze fracture transmission electron microscopy. [4,5] In the N_{TB} phase, the achiral molecules form a helix and the director is tilted with respect to the helical axis, see Figure 1. The induced twist may be either left or right handed and equal amounts of both types of helix are expected. To date, the N_{tb} phase has been observed for relatively few liquid crystal dimers and bent core mesogens. Given this very limited data set, the development of the empirical relationships linking molecular structure to the observation of this exciting new phase is very much at an embryonic stage. Here we present a range of new liquid crystal dimers which exhibit the N_{tb} phase and discuss structure-property relationships in materials exhibiting this fascinating new phase. We will also consider the application potential of these types of liquid crystals. [6]

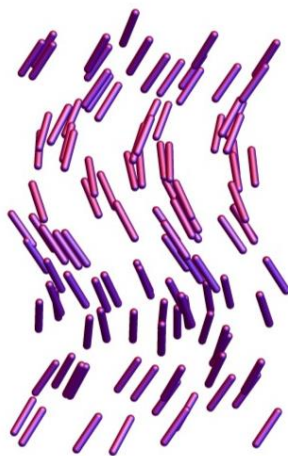


Fig. 1. A sketch of the twist-bend nematic (N_{TB}) phase.

References

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Speaker Biography

Corrie Imrie received a BSc degree in Chemistry from the University of Southampton in 1984, where he remained to complete a PhD under the supervision of Geoffrey Luckhurst, graduating in 1988. He spent a further two years in Aberdeen as a Fellow of the Royal Commission for the Exhibition of 1851. In 1989 he moved to the University of Massachusetts in Amherst as an AFOSR Research Fellow in Frank Karasz's group. Since 1992 he has been at the University of Aberdeen where he has held a number of roles including serving as Head of School. In 1993 he was awarded the British Liquid Crystal Society Young Scientist Prize, in 2011 the British Liquid Crystal Society Cyril Hilsum Medal, and in 2012, the International Liquid Crystal Society LG Display Award. In 2015 he was awarded the Excellence in Teaching Award by the College of Physical Sciences. He served as Chair of the British Liquid Crystal Society between 2007 and 2009. He is the Editor of the journal *Liquid Crystals*.