

The Twist-Bend Nematic Phase

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ABSTRACT

The recent discovery of a new nematic phase, the twist bend nematic phase, N_{TB} , has caused considerable excitement [1]. In the N_{TB} phase, the achiral molecules form a helix and the director is tilted with respect to the helical axis. The induced twist may be either left or right handed and equal amounts of both types of helix are expected. The pitch of the helix is strikingly small, typically of the order of 8 nm [2]. A particularly fascinating feature of the N_{TB} phase is the observation of spontaneous chirality even though the molecules are effectively achiral. To date, the N_{TB} phase has been observed for relatively few materials, the overwhelming majority of which are liquid crystal dimers consisting of molecules containing two mesogenic units linked by a flexible spacer [3]. Given this limited data set, the development of the empirical relationships linking molecular structure to the observation of the N_{TB} phase is very much at an embryonic stage. Here we present a range of new liquid crystal dimers and other types of materials which exhibit the N_{TB} phase and discuss structure-property relationships [4,5]. We will also consider the application potential of these types of these systems [6].

References

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