

Abraham, S.; Paul, S.; Narayan, G.; Prasad, S. K.; Shankar Rao, D. S.; Jayaraman, N.; Das, S., 2005, "Observation of chiral smectic phase (SmC*) in azobenzene linked bolaamphiphiles containing free sugars" *Adv. Funct. Mater.*, 15, 1579 – 1584 (Journal cover picture).

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Studies of the mesophase properties of materials have contributed greatly to scientific and technological advancements in the field of liquid crystals. Such advancements are interconnected critically to our ability to control the molecular arrangements of molecules that constitute the mesophase structures. Recognition that controlling the liquid crystalline order is essential has invigorated identifying molecules that would exhibit desired mesophase properties. The implication that ferroelectric properties of mesophase is essential for several applications, has arisen the need for identifying rod-shaped calamitic type compounds that would exhibit, in particular, a long-range orientational helical ordering. An important requirement to exhibit long-range chiral orientation in the molecular organization of mesophase, is the presence of chiral centers in the constituent molecules. Carbohydrates offer a natural choice par excellence in terms of offering not only several chiral centers, but also ability to strike a balance in amphiphilicity when coupled to appropriate alkyl chain fragments. With the broad objective of utilizing sugar moieties to generate new types of calamitic mesogens, we have added an additional feature of incorporating a photoisomerizable azobenzenoid unit in the mesogens. Studies of these new types of mesogens, bearing sugar termini, have revealed the existence of a chiral Smectic C* phase. The observation herein is that the molecular chirality, arising from the sugar substituents, is imparted directly to the macroscopic chirality in the Smectic C* mesophase. Such an anticipation to transform molecular chirality to macroscopic chirality is a long cherished goal. We identify that this very striking Smectic C* phase is also dependent critically on the hydrophilic-hydrophobic balance within the molecule. In addition, the photoisomerizable azobenzene unit within the molecule offers possibilities to modulate the chiral mesophase properties.