# The B4 Banana Phase

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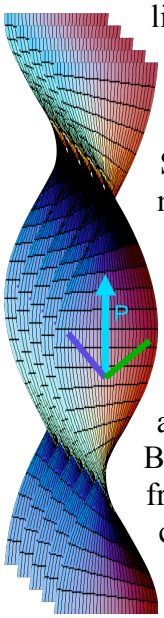
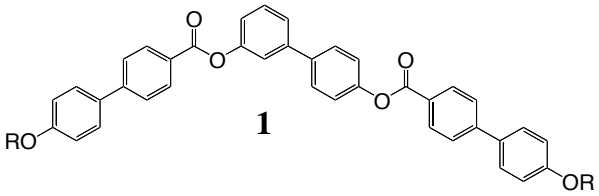
One of the earliest banana phases to be described, now termed B4, had resisted structural determination since its original discovery in 1996.[1] Recent studies show that this phase is neither a traditional crystalline solid, nor a conventional liquid crystal phase. The B4 phase is composed of single layers ~ 40Å thick, which spontaneously twist into a helical structure with negative curvature.[2] The detailed nature of these layers is still under active investigation, but solid state NMR studies suggest the layers are crystalline.[3] These layers then aggregate into nano-rods composed of about five - seven layers, whose "diameter" is self-limited at about 30 nm (Figure 1). The nano-rods then further aggregate into porous filaments with a loose hexatic liquid crystalline structure. Some details of this fascinating hierarchical system will be given.




Until recently, it seemed that the B4 phase was limited to the classic „double Schiff-base" bent-core mesogen structures, where it was almost ubiquitous. Here a new B4 mesogenic system, with an extremely simple molecular structure, will be described. Thus, when the Tschierske unsymmetrical dihydroxy-biphenyl core [4] is esterified with simple p-alkoxybiphenylcarboxylic acids, a series of diesters **1**, possessing B1 and B4 phases, are obtained. The B4 phase structure is confirmed by freeze-fracture transmission electron microscopy, where nanorods with negative curvature can be seen. However, bulk optical activity, a characteristic of most double Schiff-base B4 phases, is not observed. This new B4 system will also be described.




**1**

**Fig. 1:** An illustration of the structure of a single double Schiff-base B4 nanorod composed of ~ 5-7 layers is shown. The polarization in the rods is oriented along the helix axis of the twisted layers.

**References**

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