MAR12-2011-005660

Abstract for an Invited Paper
for the MAR12 Meeting of
the American Physical Society

Chiral Self-Assembly[1]

ROBERT MEYER[2], Physics Department, Brandeis University, Waltham, MA 02454

Chirality, the lack of reflection symmetry, at the molecular level has a profound influence on the ordering of molecular assemblages at the macroscopic scale. The example discussed here is the self-assembly of monolayers of rod-like fd virus particles, with the virus particles oriented on the average perpendicular to the plane of the layer, like a single layer of a smectic-A liquid crystal. Because these virus particles are chiral, they would prefer a twisted packing, which is incompatible with the layer structure. The twisted packing can only appear locally, at layer edges or in isolated defects in the interior of the layer. As chirality increases, the twisted regions achieve lower energy, until they can drive remarkable transformations to structures with longer edges and/or a greater number of defects.

[1]Supported by the MRSEC at Brandeis University, NSF-MRSEC-0820492
[2]Director, MRSEC at Brandeis University