Nelson, David R.; **Kamien, Randall D.**

Polymer braids and iterated moiré maps. (English) Zbl 0885.60034

Jerison, David (ed.) et al., The legacy of Norbert Wiener: a centennial symposium. In honor of the 100th anniversary of Norbert Wiener's birth, October 8-14, 1994, Cambridge, MA, USA. Providence, RI: American Mathematical Society. Proc. Symp. Pure Math. 60, 261-271 (1997).

Summary: Crystalline order in dense packings of long polymers with a definite handedness is difficult to reconcile with the tendency of these chiral objects to twist and braid about each other. If the chirality is weak, the state of lowest energy is a triangular lattice of rigid rods. When the chirality is strong, however, screw dislocations proliferate, leading to either a tilt grain boundary phase or a new "moiré state" with twisted bond order. In the latter case, polymer trajectories in the plane perpendicular to their average direction are described by iterated moiré maps of remarkable complexity, reminiscent of dynamical systems.

For the entire collection see [Zbl 0869.00026].

MSC:

60G18 Self-similar stochastic processes
82D60 Statistical mechanical studies of polymers
82D30 Statistical mechanical studies of random media, disordered materials (including liquid crystals and spin glasses)

Keywords:

dense packings of long polymers; triangular lattice of rigid rods; twisted bond order