

Introduction to Polymer Crystallization

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Course description

Polymer crystallization, despite an old problem, it was identified as one of the top current challenges in polymer physics.ⁱ

In this introductory lecture on the subject, we start with lessons we learned from nature on selforganization.

We explore:

- The levels of polymer organization (unit cell, lamellar, superstructure);
- Chain folding and the density argument;
- Crystallization from solution; Ideal crystal and the equilibrium melting temperature;
- Domain spacing and degree of crystallinity;
- Kinetics of crystallization (Avrami/Kolmogorov theory);
- The Lauritzen-Hoffman theory, the entropic theory (Sadler-Gilmer), and the transient phase during growth (Strobl);
- Dynamics of semicrystalline polymers;
- Crystallization under confinement.

ⁱ T. Lodge, Celebrating 50 years of Macromolecules: Macromolecules 2017, 50, 9525–9527