W0511

Combined Scattering Techniques for the Characterization of Polymer Crystallization. Bart Goderis, Catholic Univ. of Leuven, Chemistry Dept., Div. of Molecular and Nanomaterials, Celestijnenlaan 200F, 3001 Heverlee, Belgium.

Due to their long chain architecture, crystallizable polymers rarely reach a fully crystalline state. In most cases they adopt a semicrystalline morphology consisting of alternating crystalline and amorphous layers. Stacks of such nano-layers are further arranged in micrometer sized, spherulitic aggregates. The one dimensional stack morphology is most conveniently characterized by small angle X-ray scattering (SAXS), yielding the thickness of the layers, thickness distributions and crystalline fractions. Using synchrotron radiation, the transformation of a polymer melt into semicrystalline layers stacks can be followed. Methods to characterize this space filling process, based on a combination of SAXS and small angle light scattering, are introduced. Finally, because of rapid cooling procedures, applied in day-to-day practice, polymer crystals may display considerable branching. It is illustrated how a thorough image analysis of AFM images helps developing structural models for a better interpretation of the SAXS data.