Dynamic light scattering from polymers: Fine tuning of the method

Petr Štěpánek
Institute of Macromolecular Chemistry CAS, Prague, Czech Republic

Dynamic light scattering (DLS) has become a routine characterization technique used mostly for the size determination of various objects in liquid dispersions. This contribution shall address various difficulties and challenges encouneterd during measurement of more complex polymer systems, in particular:

1. Handling of "difficult" samples such as systems containing dust or large particles, systems exhibiting multiple light scattering, superimposed diffusive and relaxation behavior of decay rate, systems with a combination of weakly and strongly scattering objects, systems with multiple relaxation modes. The techniques used are the software- and hardware-based dust filtering, subtraction method, multiangle data analysis, 3-dimensional analysis of DLS correlation functions.

2. Applications of DLS to various complex systems such as internal dynamics of block copolymers in solutions, collective diffusion in concentrated polymer solutions, DLS from polymers under zero-average contrast conditions, critical behavior and correlation lengths in polymer blends and in bicontinuous microemulsions, density fluctuations in polymer melts, and detection of undulation modes in polymer systems with lamellar morphology.

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