

Elucidation of Mechanism for Response of Stimuli-Responsive, Water-Soluble Polymers by Light Scattering.

Grigor B. Bantchev, Sreelatha S. Balamurugan, Robin L. McCarley

We will report light scattering characterization of polymers that respond to changes in their environment, giving rise to changes in their shape and size in aqueous media.

The first study targets a novel, thermally responsive, water-soluble poly(thiophene), PT, possessing poly(*N*-isopropylacrylamide), denoted PNIPAAm, chains at the 3-position. In water, this polymer exhibits a sharp reversible change in the conformation when passing through a solution temperature of 31-33 °C. This temperature dependence results from the transition of the PNIPAAm graft from an extended, random-coiled structure to a collapsed sphere. The change of the grafted chains leads to changes of the PT backbone conformation, too.

The second study is revolving around the change in the hydrodynamic radius of poly(propylene imine) dendrimers as a function of the pH with dynamic light scattering (DLS). The measurements showed no variation of the hydrodynamic radius with alteration of solution pH – a result that is in disagreement with the theoretical predictions. In addition, the measured sizes are larger than those expected from a collapsed sphere model.