Temoresponsive characterization of nanoparticles of polyoxazolines with cobalt bis(dicarbollide) anion

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Recently, polyalkyloxazolines have become great competitor of polyethyleneoxide in biomedical applications, due to their biocompatibility, possibility of various modifications, hydrophilicity and even thermoresponsivity depending on type of alkyl group. Thermoresponsive poly(2-methyl oxazoline)-*block*-poly(2-propyl oxazoline), (PMeOX)₄₀-(PPrOX)₈₀, was synthesized and its water solution behavior was studied. LCST occurring around 30°C was observed by different techniques. Above this temperature nanoparticles of size around 30 nm were detected.

Sodium cobalt bis(dicarbollide), COSAN, gives many potential medical and other applications. We already discovered that COSAN specifically interacts with polyoxazolines. Now we present thermoresponsive polymeric nanoparticles containing COSAN. After every addition of COSAN, LCST continually disappears and shifts to lower temperatures. Nanoparticles with increasing content of COSAN are smaller, with size of 15 nm. Presented results were obtained by means of light scattering, NMR, SAXS and cryo-TEM.



Figure 1 Temperature dependence of immobilization of different groups in pure (PMeOX)₄₀-(PPrOX)₈₀ (left) and immobilization of ethylene units in polymer-COSAN nanoparticles (right). The fraction of frozen segments was calculated from decrease of corresponding NMR signals.

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