

## **STIMULI-RESPONSIVE NANO-STRUCTURES OF PH- SENSITIVE GRADIENT COPOLYMERS**

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A novel type of amphiphilic ionic copolymers comprising hydrophilic poly(acrylic acid)-gradient-poly(acrylic acid)/poly(styrene) blocks has been synthesized by direct Nitroxide-Mediated Polymerization (NMP). The aggregation behaviour of the copolymers in aqueous medium have been studied by small angle neutron scattering (SANS), fluorescence spectroscopy, static light scattering (SLS) in a wide range of pH and salinity and compared to that of the homologous diblock copolymers.

We have demonstrated that the solution properties and aggregation behavior of the gradient copolymers are markedly different from those of the diblock copolymers. In particular, the gradient copolymers are directly soluble in water at room temperature without special experimental procedure. The SANS spectra for the copolymer solution exhibit a correlation peak confirming the formation of micelles with a repulsive corona. Our results indicate, that micelles of the amphiphilic gradient copolymers exhibit strong pH-responsive properties. In contrast to "frozen" aggregates of the homologous diblock copolymers, these micelles are capable to rearrange the aggregation state (aggregation number) and dimensions as a triggered response to variation of the environmental pH or salinity. This property determines potential application of the water-soluble amphiphilic gradient copolymers for design of the nano-scale delivery systems for low molecular weight drugs and biological molecules (proteins, nucleic acids).