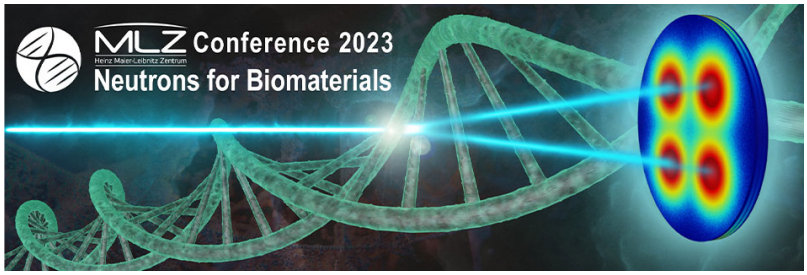

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Polymer composition profile for controlled thermo-responsive nanoassemblies

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The self-assembly behavior of amphiphiles in a polar solvent is still considered a hot topic for application strategies. Their organization into nanostructured systems has been extensively applied in bio-nanotechnology for various purposes: either mimicking biological components of lipids and proteins or bio-sensing and controlled release in materials science and drug delivery. However, the incorporation of stimulus-responsive scaffolds into the amphiphilic assemblies has introduced new possibilities for the design of advanced devices in nanotechnology applications. Here, we investigated the effect of the spatial distribution of comonomers in physiologically responsive copolymers. Copolymers containing 50% of dimethylacrylamide (DMA) monomer and 50% of N-isopropyl acrylamide (NIPAM) monomer, but with different compositional profiles, ranging from an A-B diblock copolymer to a linear gradient poly(A-grad-B) copolymer, were synthesized and the effect of the balance between molecular weight and distribution profile on the thermo-responsive proprieties was addressed. In this contribution, we explore the effect of comonomer distribution on polymer properties by different experimental techniques, i.e. dynamic light scattering, cryogenic transmission electron microscopy, nuclear magnetic resonance spectroscopy and small angle neutron scattering, and demonstrate that thermo-responsive assemblies can be used for the design of nanotechnological applications like as steric stabilizers of lipid nanoparticles1.

Reference
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