

# PC 89

## CORE-CROSSLINKED POLYMERIZED MICELLES AND DENDRONIZED NANOPARTICLES

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Polymerization of micelle-forming monomers is promising way for the synthesis of well-organized macromolecules and nano-sized particles. Polymerizable ionic surfactant molecules and polymerized micelles, obtained from them, can be considered as building blocks in construction of complex macromolecular objects being molecules and nanoparticles at once.

In this work we used N-acryloyl-11-aminoundecanoic acid (AAU) and its sodium salt (AAU-Na) as core part in nanoparticles formation. Polymerization of AAU-Na in micellar solution leads to unimolecular micelles which nevertheless remain linear macromolecules of comb-like ionomers adopting micellar conformation in aqueous solution. Solubilization of cross-linking agent in micelle core before polymerization enables obtaining unimolecular cross-linked micelles (cPAAU) having stable dimensions on dilution[1]. cPAAU of different molecular masses (from 12000 to 1000000) were obtained using different synthesis conditions (ionic strength and monomer concentration). Functional (COOH) groups at the cross-linked micelle periphery could be used for layer-by-layer construction of complex nanoparticles by means of ionic binding of appropriate building blocks bearing oppositely charged anchor groups. We used lysine or diaminobenzoic acid based dendrons bearing dimethylaminopropylamide focal group and 4-8 acrylamido peripheral groups to form ionic complexes with micellar cPAAU core. Ionic complexes formation proceed to 100% binding in the case of cPAAU having all functional groups fixed at the periphery, whereas non-cross-linked PAAU binds only about 30% dendrons.

Trial template polymerizations were performed for acrylamido groups of the counterions at PAMPS, PAAU and cPAAU matrices. The polymerization proceeds at averaged concentrations of polymerizable groups in the range 0.01 to 0.0002 mol/L.

1. Zorin, I.M., Reznichenko, T.S., Bilibin A.Yu. *Polymer Bull.* 2006, **57**, 57

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