

Tandem Post-polymerization Modification of a Single Pentafluorophenyl Ester-Bearing Polymer: A Simple Route to Stimuli-responsive Polymeric Nanoparticles

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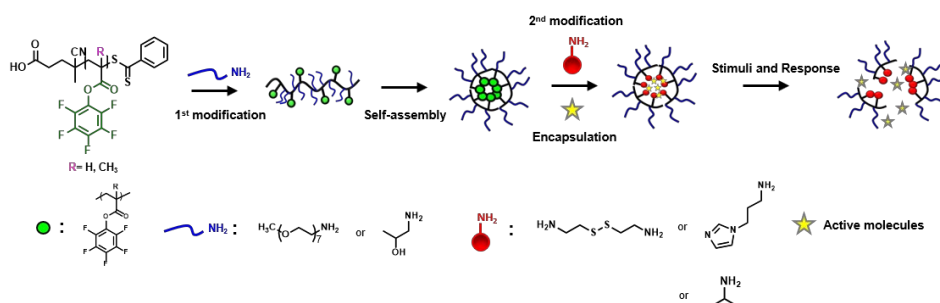
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Polymer precursor bearing active side groups has recently been introduced as a versatile and ready-to-use toolbox that can undergo tandem post-polymerization modification with designated nucleophilic modifier, allowing for multiple functionalities to be conveniently and proportionally incorporated. This presentation will feature the development of stimuli-responsive nanoparticles from a single pentafluorophenyl ester-containing polymer, synthesized from active ester-containing monomer, pentafluorophenyl (me)acrylate (PFP(M)A). PFP(M)A subjected to partial post-polymerization modification with amine-terminated hydrophilic molecules (i.e. 1-amino-2-propanal, amine-terminated poly(ethylene oxide) yielded amphiphilic random copolymers. The inherent hydrophobicity of pentafluorophenyl groups provided a driving force for nanoparticle formation upon water-induced micellization. Redox- and pH-responsive nanoparticles can be obtained by subsequent post functionalization of the self-assembled nanoparticles with amino-terminated di-thiol crosslinker and 1-(3-aminopropyl) imidazole, respectively. These developed nanoparticles possess a strong potential as carriers for therapeutic agent delivery that can be redox- or acid-triggered.

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Research Interest: Chemical modification and characterization of polymer surface, Functional organic thin film for biotechnology and nanotechnology, Polymer for biomedical application

