

## Accepted Manuscript

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PII: S0021-9797(17)30431-9  
DOI: <http://dx.doi.org/10.1016/j.jcis.2017.04.030>  
Reference: YJCIS 22242

To appear in: *Journal of Colloid and Interface Science*

Received Date: 16 January 2017  
Revised Date: 8 April 2017  
Accepted Date: 10 April 2017

Please cite this article as: S. Noree, V. Tangpasuthadol, S. Kiatkamjornwong, V.P. Hoven, Cascade Post-polymerization Modification of Single Pentafluorophenyl ester-bearing Homopolymer as a Facile Route to Redox-responsive Nanogels, *Journal of Colloid and Interface Science* (2017), doi: <http://dx.doi.org/10.1016/j.jcis.2017.04.030>

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**Cascade Post-polymerization Modification of Single Pentafluorophenyl ester-bearing Homopolymer as a Facile Route to Redox-responsive Nanogels**

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**Abstract**

Poly(pentafluorophenyl methacrylate) (PPFPMA) was first subjected to post-polymerization modification with oligo(ethylene glycol) methyl ether amine (OEG-NH<sub>2</sub>) and yielded poly(pentafluorophenyl methacrylate)-*co*-poly(oligo(ethylene glycol methacrylamide)), PPFPMA-*co*-POEGMAM. These amphiphilic random copolymers can self-assemble into micellar nanoparticles in water having sizes less than 100 nm. By tandemly reacting the pentafluorophenyl (PFP) groups in the copolymeric nanoparticles with a dithiol crosslinker, cystamine, redox-responsive nanogels can be formed. The last step of post functionalization with isopropylamine was introduced in order to remove the remaining PFP groups in the nanogels. Stepwise post functionalization can be monitored by FTIR and <sup>19</sup>F NMR spectroscopy. Release of a model hydrophobic drug, Nile red (NR) from the nanogels, simultaneously encapsulated during micelles formation, can be accelerated in the presence of glutathione (GSH) especially at 37°C. Results from cytocompatibility evaluation suggested that these developed redox-responsive nanogels strongly possessed a potential for applications in controlled delivery.

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