

## Self-Assembly and Thermal/pH Dual-Stimuli Responses Behaviors of Starch-g-P(DEAEMA-PEGMA) in Aqueous Solution

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Recently, stimuli-responsive polymers have attracted more and more interests for their applications in biological and medical fields, e.g., drug release and sensors. Here, thermal/pH dual-stimuli responses copolymers starch graft poly(2-(diethylamino) ethyl methacrylate-co-polyethylene glycol monomethyl ether methacrylate) (starch-g-P(DEAEMA-co-PEGMA)) were synthesized by single electron transfer (SET) radical polymerization. The self-assembly and thermal/pH responses behaviors were investigated by DLS. The hydrodynamic diameters ( $D_h$ ) of micelles formed by the copolymers in aqueous medium increased and then decreased with pH values increasing from 1.5 to 12.0, peaking at pH 5.5. In acid conditions (pH 1.5), the copolymers chains existed in unimer state. With pH increasing, the core-shell structured micelles were formed with starch as core and PDEAEMA and PPEGMA segments as shell. The decrease in  $D_h$  at pH 5.5–7.4 was attributed to the collapse of PDEAEMA segments because of the deprotonation. The  $D_h$  also decreased with the increase of temperature. And the onset temperature when  $D_h$  decreased depends on the molar ratio of DEAEMA and PEGMA units, the molecular weight of PDEAEMA in grafted chains and the pH value of the solution. The thermal and pH responses of the graft copolymers are reversible.

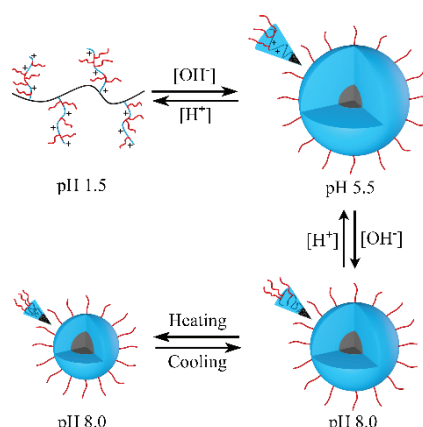


Illustration of the thermo and pH dual-responsive behaviors of the starch-g-P(DEAEMA-co-PEGMA) micelles.

### Biography:

Professor Zhengping Liu has been working in College of Chemistry, Beijing Normal University. He finished his B.Sc. in 1987 and M. Sc. in 1990 and he finished his Ph. D. in 1993 at Department of Chemistry, Jilin University, China. From 1993-1995 he pursued as Postdoc in Department of Chemistry, Peking University at China. From 1995-1996 he worked as Assistant Professor, 1996-2001 as Associate Professor and 2001–present has been Full Professor in Department of Chemistry, Beijing Normal University at China. In 2001 he worked as Visiting Scholar in Department of Chemistry, University of California at Berkeley at United States. His research interest is environmentally friendly polymer and functional polymer. He has published more than 100 papers and applied 16 patents. He received an award for National Excellent Science and Technology Researchers in 2014.