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Synthesis of zwitterionic polymer-based amphiphilic triblock copolymers by atom transfer radical polymerization for production of extremely stable nanoemulsions JIN YONG LEE, JI EUN KIM, JIN WOONG KIM, Hanyang Univ — In fields of soft matter, there have been growing interests in utilizing amphiphilic block copolymers due to their intriguing properties, such as surface activity as well as self-assembly. In this work, we synthesize a series of poly (2-(methacryloyloxy) ethyl phosphorylcholine)-*b*-poly (ϵ -caprolactone)-*b*-poly (2-(methacryloyloxy) ethyl phosphorylcholine) (PMPC-*b*-PCL-*b*-PMPC) triblock copolymers by using atom transfer radical polymerization (ATRP). We have a particular interest in using poly (2-(methacryloyloxy) ethyl phosphorylcholine) (PMPC) as a hydrophilic block, since it can have both electrostatic repulsion and steric repulsion in complex fluid systems. Assembling them at the oil-water interface by using the phase inversion method enables production of highly stable nanoemulsions. From the analyses of the crystallography and self-assembly behavior, we have found that the triblock copolymers assemble to form a flexible but tough molecular thin film at the interface, which is essential for the remarkable improvement in the emulsion stability.

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