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SYNTHESIS OF FUNCTIONAL TRIBLOCK POLYMER COLLOIDS BY CONTROLLED/LIVING RADICAL PHOTOPOLYMERIZATION IN MINIEMULSION

J. Tonnar, E. Pouget, P. Lacroix-Desmazes*, B. Boutevin

Institut Charles Gerhardt - UMR5253 CNRS/UM2/ENSCM/UM1 - Ingénierie et Architectures Macromoléculaires, Ecole Nationale Supérieure de Chimie de Montpellier, 8 rue de l'Ecole Normale, 34296 Montpellier Cedex 5, France
patrick.lacroix-desmazes@enscm.fr; <http://www.iam.icgm.fr>

Among controlled radical polymerization techniques, iodine transfer polymerization (ITP) based on the use of alkyl iodides as reversible transfer agents has already led to commercial products.¹ Recently, we published a new controlled radical polymerization method based on the use of molecular iodine I₂ (a cheap and easily available compound) in combination with a conventional radical initiator (ex: 2,2'-azobisisobutyronitrile).² Controlled radical polymerizations in aqueous emulsion are generally facing many problems related to the instability of the species in the presence of water and the partitioning of the species between the different phases.³ However, several works in miniemulsion and emulsion have been successful by thermally initiated ITP and RITP,⁴⁻⁶ whereas studies on photopolymerization in dispersed media remain scarce.⁷ Herein, we will present the synthesis of poly(vinyl acetate)-*b*-poly-dimethyl siloxane)-*b*-poly(vinyl acetate) PVAc-*b*-PDMS-*b*-PVAc triblock copolymers by controlled/living radical photopolymerization of vinyl acetate in miniemulsion. This is the first time that these block copolymers have been prepared in dispersed aqueous media which is of major interest for an industrial application. Emphasis will be given on the beneficial mechanistic implications of using a heterogeneous aqueous reaction medium. Such triblock copolymer colloids offer the possibility to prepare amphiphilic PVA-*b*-PDMS-*b*-PVA functional triblock copolymers by hydrolysis of the PVAc blocks.

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