Preparation of Functional Chitin Nanofiber Composite/hollow Particles by Pickering Emulsion Polymerization

The Pacific Polymer Conference 2019 (PPC16)
8-12, December 2019, Singapore

Preparation of Functional Chitin Nanofiber Composite/hollow Particles by Pickering Emulsion Polymerization

Seiichiro Noguchi[1], Kazuya Yamamoto[1], and Jun-ichi Kadokawa[1]

Abstract

Effective utilization of chitin as the biomass resource has attracted much attention to obtain new bio-based materials. Previously, we reported that the regeneration from a chitin/1-allyl-3-methylimidazolium bromide ion gel using methanol fabricated self-assembled chitin nanofibers. In this study, we performed Pickering emulsion polymerization of styrene using anonic maleyloyl chitin nanofibers as stabilizers. Composite particles were prepared by Pickering emulsion polymerization. We then attempted the conversion of the composite particles into hollow particles by dissolving out inner polystyrene using toluene [1]. The hollow particles were poorly stable when they were re-dispersed in water. To improve stability of hollow particles, in addition to maleyloyl groups, methacryl polymerizable groups were introduced on chitin nanofibers to occur copolymerization with styrene. Hollow particles fabricated by using the bifunctional chitin nanofibers re-dispersed in water while maintaining their morphology. Pyrene, a hydrophobic dye, was encapsulated in cavities of hollow particles by hydrophobic interaction [2]. The encapsulated dye could be released by treatment of the resulting fluorescent hollow particles with surfactant, oleyl alcohol, in water.

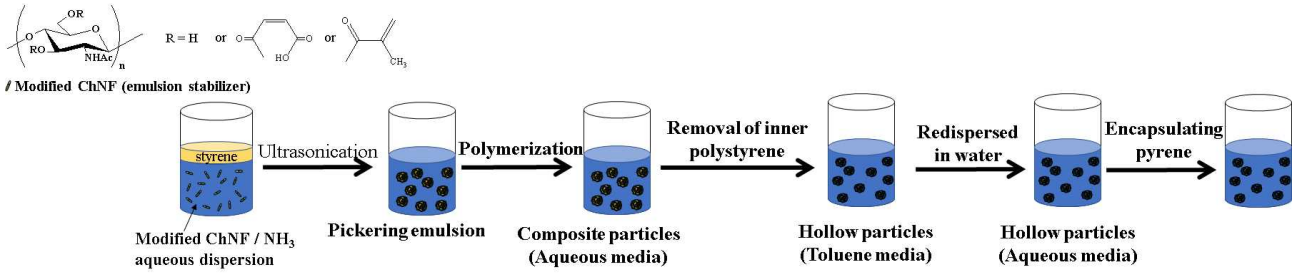

Figure 1. Preparation of functional chitin nanofiber composite/hollow particles by pickering emulsion polymerization.

References

[1] S. Noguchi, K. Sato, K. Yamamoto, J. Kadokawa, *Int. J. Biol. Macromol.*, **126**, 187 (2019).

[2] S. Noguchi, K. Yamamoto, J. Kadokawa, *Int. J. Biol. Macromol.*, in press.

[1] Department of Chemistry, Biotechnology, and Chemical Engineering, Graduate School of Science and Engineering, Kagoshima University, Kagoshima 890-0065, Japan