# Preparation of Chitin Nanofiber-based Composite Materials by Surface Modification

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Abstract

Chitin is widely distributed in nature and an important renewable resource. However, it has been difficult to provide various material applications from chitin, due to lack of solubility and processability. Derivatization of chitin is one of the efficient methods for its material applications. Recently, we found that an ionic liquid of 1-allyl-3-methylimidazolium bromide (AMIMBr) dissolved or swelled chitin, which was also used as a solvent for acetylation of chitin with acetic anhydride under mild conditions [1,2]. Furthermore, we found that self-assembled chitin nanofiber film was obtained by regeneration from a chitin ion gel with AMIMBr using methanol, followed by filtration [3]. In this study, we performed the preparation of self-assembled chitin nanofiber-based composite materials through surface modification (Scheme). First, a self-assembled chitin nanofiber dispersion was prepared according to our previous publication [3]. Then, surface acetylation of the product was performed by reaction with acetic anhydride for 12 h at rt in a dispersion with DMF to obtain partially acetylated chitin nanofibers, which was isolated by filtration to give a film. The film showed compatibility with hydrophobic polymers. For example, the composite film of chitin nanofiber with polyethylene was obtained.
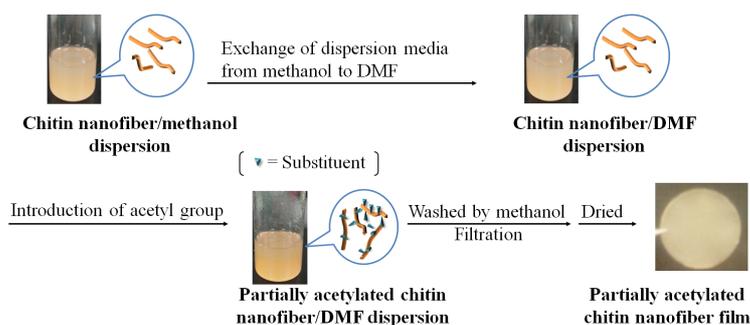
Scheme. Preparation of partially acetylated chitin nanofiber film by surface modification

References

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