鹿児島大学リポジトリ
Kagoshima University
Repository

Preparation of Carboxymethyl Cellulose/Chitin Nanofiber Composite Films

著者	HATANAKA Daisuke, YAMAMOTO Kazuya, KADOKAWA Jun-ichi
journal or publication title	The Research Reports of the Faculty of Engineering, Kagoshima University
volume	57
page range	42-42
year	2015-11-01
URL	http://hdl.handle.net/10232/00029723

2014 IUPAC World Polymer Congress (MACRO 2014), Chiangmai International Convention and Exhibition Centre, 6-11 July 2014, Chiang Mai, Thailand

Preparation of Carboxymethyl Cellulose/Chitin Nanofiber Composite Films

Daisuke HATANAKA, Kazuya YAMAMOTO, Jun-ichi KADOKAWA

Graduate School of Science and Engineering, Kagoshima University

Abstract

Carboxymethyl cellulose (CMC), an acidic polysaccharide, is one of the widely applied cellulose derivatives. On the other hand, chitin, an aminopolysaccharide, can be considered as a basic polysaccharide because of the presence of amino groups due to deacetylation of a few percents of acetamido groups. We already reported that a dispersion of chitin nanofibers (CNF) was obtained by regeneration technique from a chitin/1-allyl-3-methylimidazolium bromide ion gel using methanol [1-3]. To produce useful composite materials from these acidic and basic polysaccharides, in this study, we performed the preparation of CMC/CNF composite films by electrostatic interaction [4]. A water insoluble CMC film was first prepared by the treatment of a CMC sodium salt aqueous solution with the cation-exchange resin, followed by drying. The preparation of CMC/CNF composite films was performed by immersing the CMC films in the CNF dispersions with different contents. By the weight measurements of the resulting films, it was confirmed that the amounts of the absorbed CNF per unit area on the CMC films increased with increasing the CNF contents. The SEM images showed that CNF were absorbed on the CMC films, giving rise to the composite films (Figure). The composite films exhibited better mechanical property than that of the CMC film.

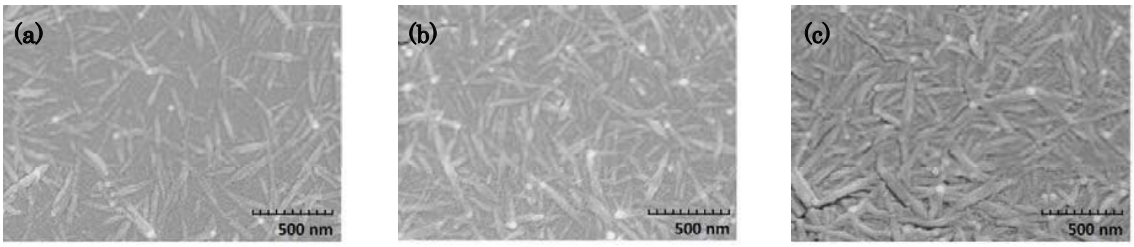

Figure. SEM images of CMC/CNF composite films prepared by using CNF dispersions ((a) 0.75 mg/mL, (b) 1.5 mg/mL, (c) 3.0 mg/mL)

References

1. K. Prasad, M. Murakami, Y. Kaneko, A. Takada, Y. Nakamura, J. Kadokawa, Int. J. Biol. Macromol., 45, 221 (2009).
2. J. Kadokawa, A. Takegawa, S. Mine, K. Prasad, Carbohydr. Polym., 84, 1408 (2011).
3. R. Tajiri, T. Setoguchi, S. Wakizono, K. Yamamoto, and J. Kadokawa, J. Biobased Mater. Bioenergy, 7, 655 (2013).
4. D. Hatanaka, K. Yamamoto, and J. Kadokawa, Int. J. Biol. Macromol., 69, 35 (2014).