

## Composite Materials from Two Kinds of Chitin Nanofibers

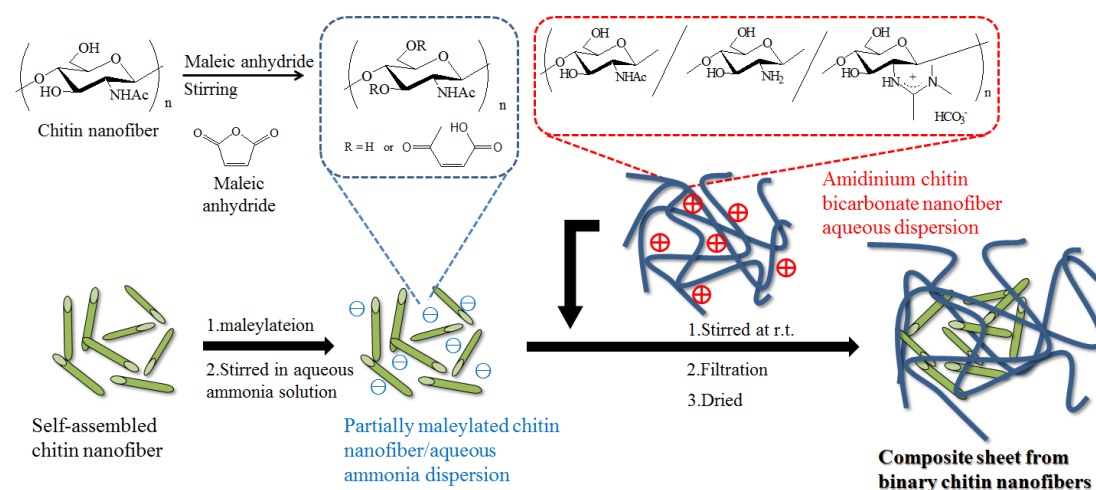
著者	SATO Koki, YAMAMOTO Kazuya, KADOKAWA Jun-ichi
journal or publication title	The Research Reports of the Faculty of Engineering, Kagoshima University
volume	60
page range	18-18
year	2019
URL	<a href="http://hdl.handle.net/10232/00030781">http://hdl.handle.net/10232/00030781</a>

## Composite Materials from Two Kinds of Chitin Nanofibers

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### Abstract

Chitin is a natural polysaccharide composed of  $\beta(1\rightarrow4)$ -linked *N*-acetyl-D-glucosamine units. Although chitin is one of the most abundant polysaccharides on the earth, it is mostly poor in processability and solubility due to strong crystalline structure by numerous hydrogen bonds. It has been well accepted that the construction of nanostructures is an efficient method for chitin materialization [1]. We have successfully prepared chitin nanofibers in two ways based on top down and bottom up approaches. We already reported by the former approach that an amidinated chitin was converted into a cationic amidinium chitin nanofibers by CO<sub>2</sub> gas bubbling in water [2]. On the other hand, by the latter approach, we found that self-assembled chitin nanofibers were obtained by regeneration from a chitin ion gel with 1-allyl-3-methylimidazolium bromide using methanol [3]. In this study, we performed the preparation of composite materials from the two kinds of chitin nanofibers by electrostatic interaction (Scheme 1). Anionic chitin nanofibers were first prepared by the reaction of maleic anhydride with hydroxy groups on self-assembled chitin nanofibers. For composition, the partially maleylated chitin nanofiber dispersion, which was prepared by stirring in aqueous ammonia, was then added to an amidinium chitin nanofiber aqueous dispersion and stirred. The morphology of the isolated composite sheet from binary chitin nanofibers at nano-scale was evaluated by SEM measurement.



Scheme 1. Preparation of composite sheet from cationic and anionic chitin nanofibers

### References

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- [3] J. Kadokawa, A. Takegawa, S. Mine, K. Prasad, *Carbohydr. Polym.* 84 (2011) 1408.