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Stress transfer of poly (vinyl alcohol) / montmorillonite nanocomposite using X-ray diffraction

Seira Morimune, Masaru Kotera, Takashi Nishino*

Department of Chemical Science and Engineering, Graduate School of Engineering,

Kobe University, Rokko, Nada, Kobe 657-8501, Japan

Tel: +81-78-803-6198, FAX: +81-78-803-6198, E-mail: tnishino@kobe-u.ac.jp

* corresponding author: Takashi Nishino

Abstract

Poly (vinyl alcohol) (PVA)/montmorillonite (MMT) nanocomposite was prepared simply by casting aqueous suspension. X-ray diffraction, scanning electron microscopy (SEM) and tensile test were used to investigate the structure and the mechanical properties of the nanocomposite. In the nanocomposite, MMT layers were found to be successfully exfoliated and nano dispersed in the PVA matrix. The mechanical properties of the nanocomposite increased by the incorporation of only a small amount (5 %W/W) of MMT. "X-ray diffraction method" was applied to investigate the stress transfer system in the nanocomposite from a microscopic point of view. The stress on

MMT is found to be incredibly high compared with that applied on the whole composite; the outstanding stress transfer in the nanocomposite was revealed. Therefore the high mechanical properties of the PVA/MMT nanocomposite could be attributed to this excellent stress transfer system in the nanocomposite.

Key words

Poly (vinyl alcohol) / Montmorillonite / Reinforcement / X-ray diffraction /

Stress transfer