1P155 Structure and Properties of Hybrid Film Fabricated by Layer by Layer Assembly of Sacran and Imogolite Nanotubes

○Linlin LI,[1] Wei MA,[2] Yuji HIGAKI,[3] Maiko OKAJIMA,[4] Tatsuto KANEKO,[4] and Atsushi TAKAHARA[1,3,5]

[1] Graduate School of Engineering, Kyushu University, 744 Motooka, Nishi-ku, Fukuoka 819-0395, Japan.
[2] International Institute for Carbon-Neutral Energy Research (WPI-I2CNER), Kyushu University, 744 Motooka, Nishi-ku, Fukuoka 819-0395, Japan
[3] Department of Integrated Science and Technology, Faculty of Science and Technology, Oita University,700 Dannoharu, Oita 870-1192, Japan.
[4] School of Materials Science, Japan Advanced Institute of Science and Technology (JAIST), 1-1 Asahidai, Nomi, Ishikawa, 923-1292, Japan
[5] Institute for Materials Chemistry and Engineering, Kyushu University, 744 Motooka, Nishi-ku, Fukuoka 819-0395, Japan
E-mail: takahara@cstf.kyushu-u.ac.jp

Sacran is the ultra-high molecular negatively charged polysaccharide extracted from the aphanothece sacrum, and imogolite is a tubular clay with positively charged external surface in acidic water. Therefore, sacran/imogolite nanotubes hybrid films can be fabricated by layer-by-layer (LBL) assembly. The LBL assembly process was monitored by Fourier Transform Infrared Spectrometer (FT-IR) and AFM (Figure 1). The film thickness increased linearly with the increase in the bilayers. Free-standing film was obtained by repeating the assembly process on a sacrificial substrate. UV-vis test indicated that this LBL film was more transparent than the sacran/imogolite blend film. Surface morphology of the sacran/imogolite LBL film showed that the thin film was uniform, and plenty of imogolite nanotubes were absorbed onto the sacran layer. The structure and the mechanical property of the films were also investigated.

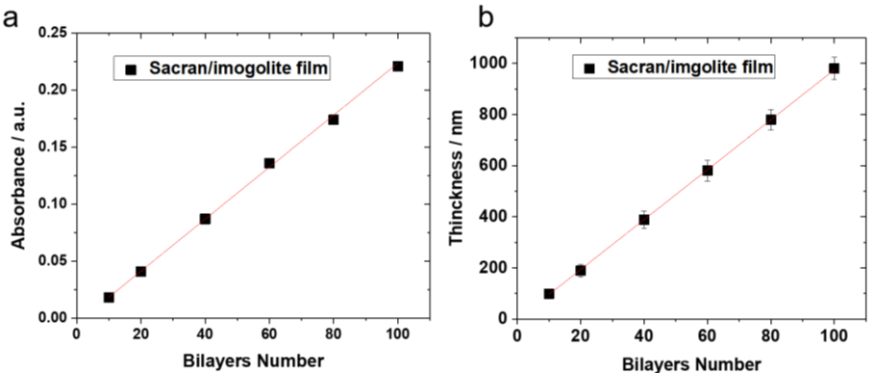

Figure 1. Bilayer number dependence of (a) FT-IR absorbance intensity at 2910 cm^{-1} and (b) thickness determined by AFM at each desired bilayers of the sacran/imogolite LBL assembly.