Preparation of Mechanically Improved Transparent PMMA/CNF Composite Film via Pickering Emulsion Template

김동우, 최시영†
KAIST
(sqchoi@kaist.ac.kr†)

Cellulose nanofiber (CNF) is a promising nanofiller for fabrication of polymer nanocomposite with high performances due to its three-dimensional anisotropy and high mechanical strength. A critical challenge in fabricating high performance polymer-CNF nanocomposites is dispersion of cellulose nanofiber in a polymer matrix. Here, we report a facile aqueous preparation process for nanostructured poly (methyl methacrylate) (PMMA) / CNF composite. PMMA particles with a narrow size distribution using CNF as the stabilizer were prepared via Pickering emulsion polymerization that assures fine dispersion and enhances filler-loading. Pickering emulsion template provides the way for an environmental-friendly process for the production of high quality polymer / CNF nanocomposites as it is water based (no organic solvent is employed) and surfactant-free. Furthermore, the resulting nanocomposites with 10 wt% CNF showed improved mechanical strength.