

Preparation and characterization of castor oil-modified polyurethane composites with cellulose nanocrystal

유기훈, 김대수<sup>†</sup>

충북대학교

(dskim@chungbuk.ac.kr<sup>†</sup>)

Polyurethane (PU) system was optimized first using two kinds of polyols, natural castor oil (CO) with a few hydroxyl groups per molecule and a petroleum-based polypropylene glycol (PPG), and hexamethylene diisocyanate. The optimized PU system was adopted to prepare PU composites with various amounts of cellulose nanocrystal (CNC). Polymerization behaviors were investigated by DSC. Physical properties of the composites were investigated by UTM, DMA and TGA. The effects of CO/PPG ratio, NCO/OH ratio, catalyst (dibutyltin dilaurate) content and CNC content were analyzed. The FTIR spectra showed the OH peak red-shift due to hydrogen bonding between urethane groups and hydroxyl groups of CNC suggesting compatibility between the PU matrix and CNC. The PU composite with CNC 5phr showed optimum tensile properties.