

Mechanical and thermal properties of the polyurethane film synthesized using polycarbonate diol: Effect of polycarbonate-diol molecular weight and NCO index

김동은, 홍예진, 방민지, 이상호<sup>†</sup>  
동아대학교  
(sangho@dau.ac.kr<sup>†</sup>)

Waterborne polyurethane dispersions (PUD) were prepared using polycarbonate-diols, 4,4'-methylenebis(cyclohexyl isocyanate), and dimethylol propionic acid with dibutyltin dilaurate catalyst. The PUDs were synthesized by the acetone process and then dried to make the PU films. The properties of polyurethanes were greatly influenced by not only the molecular weight of the polyol but also the relative amount of hard segment to soft segment. To control the ratio of hard segments to soft segments (methylene and carbonate groups) of the PUD, we used three different polycarbonate-diols, whose molecular weight were 495, 1085, and 2028, to synthesize PUDs. In addition, two types of chain extender, 1, 4-butanediol and ethylene diamine, were synthesized. Using FT-IR analysis, we performed the semi-quantitative analysis of urea, urethane, methylene, and carbonate groups in the PUDs. Mechanical properties of the PU films were measured by UTM. The glass transition and thermal degradation temperature of the PU films were measured by DSC and TGA.