

### Synthesis, Characterization, and Mechanical Property of Poly(urethane-glycidyl methacrylate-methyl methacrylate) Hybrid Polymers

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Hybrid particles of polyurethane (PU) containing a number of small poly(methyl methacrylate) (PMMA) nanoparticles inside were prepared using glycidyl methacrylate (GMA) monomer as a linker between PU and PMMA; the resulting polymers were poly(urethane-glycidyl methacrylate-methyl methacrylate) (PUGM). It was found that the average particle size ( $D_p$ ) of the PU particles decreased by the inclusion of PMMA particles possibly owing to the low-solution viscosity of PU. However,  $D_p$  of the PUGM hybrid particles increased with increasing the number of covalent bonds between PMMA and PU. Subsequently, the tensile properties of the films made of the PUGM hybrid particles were investigated. It was observed that the modulus of the PU films increased upon the addition of PMMA particle because of a filler effect. In addition, it was seen that the modulus of PUGM hybrid films increased further with increasing the number of covalent bonds. This was attributed to “restricted mobility” of PU chains anchored to the PMMA particles.