

Preparation of thermoplastic polyurethane capable of controlling the degree of functionalization by adjusting the content of azido groups(-N₃) for click reaction

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Thermoplastic polyurethane(TPU) with the controlled degree of functionalization was prepared by adjusting the content of azido groups for azide-alkyne click reaction in azido-TPU. First, PET(Poly(ECH-co-THF)diol, which is the polyol containing chlorine groups (-Cl) was prepared, and then chlorine groups were substituted with azido groups through SN₂ reaction to prepare a PGT(Poly(GAP-co-THF)diol). Azido-TPU was synthesized through urethane bonding with PGT, BDO(1,4-butanediol), and MDI(4,4'-Diphenylmethane diisocyanate). The content of chlorine groups in PET was controlled by adjusting the ratio of ECH(Epichlorohydrin) and THF(Tetrahydrofuran), and accordingly, azido groups of azido-TPU were also controlled. Herein, benzophenone, which can be cured through heat or UV, was introduced into the azido-TPU. First, the alkyne group was introduced into benzophenone through esterification for the click reaction. Azido groups of azido-TPU were substituted with benzophenone through azide-alkyne click reaction between benzophenone and azido-TPU.