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SYNTHESIS OF AMORPHOUS COPOLYMER OF POLY(ETHYLENE TEREPHTHALATE) BASED ON 1,4-CYCLOHEXANEDIMETHANOL AND STUDY THE EFFECT OF DIFFERENT PROCESS PARAMETERS ON IMPROVING PROCESSABILITY PROPERTIES

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A random poly(ethylene glycol-co-1,4-cyclohexane dimethanol terephthalate) (PETG) were synthesized by bulk copolymerization of terephthalic acid and ethylene glycol with 1,4-cyclohexane dimethanol (CHDM). Although PET has excellent basic properties, this polymer tends to crystallize rapidly and has a rather high melting temperature, low chemical resistance, a low glass-transition temperature, and low impact on notched articles for some potential applications. When copolymerized PET with CHDM, the middle composition ranges, from approximately 40/60 CHDM/EG to 20/80 CHDM/EG, have very slow crystallization rates and do not show crystallization peaks and thus are amorphous polyesters. One significant difference in the preparation of amorphous copolyesters compared to crystalline copolyesters is the need to achieve the required degree of polymerization directly in the meltphase process, so we used different process condition to obtain copolymer with high viscosity and molecular weight. Ubbelohde viscometer were used to determine intrinsic viscosity and it's molecular weight and FTIR spectroscopy were used to verifying copolymer. DSC and TGA used to study the crystallization , melting and degradation behavior. The modification of poly(ethylene terephthalate) with CHDM reduces the crystallization of the copolyester backbone, and over a wide range of comonomer concentrations, very slowly crystallizing, essentially amorphous copolyesters are formed. Increasing CHDM level more than increasing in toughness as measured by impact and increasing elongation at break values, leads to increases in Tg , low color, chemical resistance and HDT that this amorphous nature permits it to be processed into clear transparent sheets and articles.