

Preparation and Characterization of Copoly(ethylene Terephthalate/Chloro-1,4-Phenylene Terephthalate)

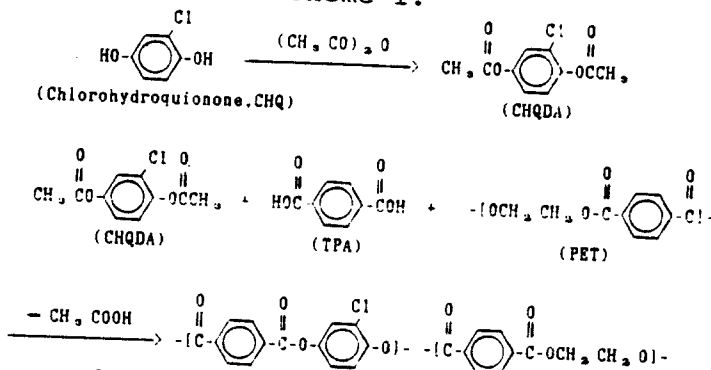
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A series of copolyesters were prepared by melt polymerization of poly(ethylene terephthalate) (PET) with chlorohydroquinone diacetate (CHQDA) and terephthalic acid (TPA) (Scheme 1), and then the reactivity, molecular structure and various properties of the polymers were investigated.

Scheme 1.



The copolyesters modified with more than 20 mol% of CHQDA became haze and then opaque during the polymerization step, and were found to be anisotropic and nematic through polarizing microscopic observation. The inherent viscosity (IV) of the polymers modified with 5-20 mol% of CHQDA was limited to about 0.35 due to the formation of ethylene acetate end groups during the melt polymerization. The polymers modified with 30-70 mol% of CHQDA had IV values of 0.67-1.1 and IV of the polymers prepared with 80 mol% or more CHQDA could not be determined owing to their insoluble property in the 60:40 phenol-tetrachloroethane solvent. The molecular structure of the polymers determined by NMR was much complicated because of chlorine in the CHQ unit, and the melt viscosity was about 30% of that of PET. Annealing of the copolyester modified with 50 mol% of CHQDA at 220°C increased the melting point, heat of fusion and inherent viscosity of the polymer as the annealing time increased. The melting point of annealed polymer increased to nearly that of PET due to solid phase rearrangement.