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Synthesis and Properties of Some Partially Aromatic Polyester Casting Samples

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A series of partially aromatic terephthalate polyesters were synthesized by melt transesterification of dimethyl terephthalate with various types of aliphatic diol compounds in 1:1.1 molar ratio. Ethylene-, di-, tri-, tetraethylene glycol and polyethylene glycol with different molecular weights 1000, 4000, 6000 as well as the prepared dihydroxy natural rubber were used. Another series of partially aromatic adipate and sebacate polyesters based on the prepared bisphenol A and its tetrabromoderivative were also synthesized by direct polycondensation esterification with adipic and sebacic acid.

Polyurethane with NCO/OH ratio equal 4 was prepared from the reaction of 2,4 toluene diisocyanate with polyethylene glycol 1000. The prepared polyurethane was mixed with different weight percentages (2, 4, 6, 8, 10 or 12 % w/w) of the prepared partially aromatic polyesters to give polyurethane/polyester compositions. Mechanical and electrical properties as well as water and chemical resistance of the prepared film samples with thickness 3-4 mm were determined and compared with those of polyurethane film sample without polyester. The data indicate that 10 % w/w of the added partially aromatic polyester increases polyurethane tensile strength, improves its insulation properties and hydrolytic stability as well as its chemical resistance. Film samples based on bisphenol A impart excellent properties as compared with those based on aliphatic glycol species and dihydroxy natural rubber.