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New Polyamides Derived from 2,5-Bis[(4-carboxyanilino) carbonyl] Pyridine and Hydantoin Derivatives: Synthesis and Characterization

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Abstract: We synthesized 2,5-bis[(4-carboxyanilino) carbonyl] pyridine (4) as a new monomer containing pyridyl moiety by using a 2-step reaction. At first 2,5-pyridine dicarboxylic acid (1) was converted to 2,5-pyridine dicarbonyl dichloride (2). Then, diacid 4 was prepared by a condensation reaction of diacid chloride (2) with p-aminobenzoic acid (3). Then, 6 new polyamides (6a-f) were synthesized through the polycondensation reaction of 2,5-bis[(4-carboxyanilino) carbonyl] pyridine (4) with 6 different derivatives of hydantoins (5a-f) in a medium consisting of N-methyl-2-pyrrolidone, triphenyl phosphite, calcium chloride, and pyridine. The polycondensation reaction produced a series of novel polyamides containing pyridyl moiety in the main chain in high yield, with inherent viscosities between 0.64 and 1.50 dL g^{-1}. The resulting polymers were fully characterized by means of FT-IR spectroscopy, elemental analysis, inherent viscosity, and solubility tests. Thermal properties of these polymers were investigated using thermal gravimetric analysis (TGA) and differential thermal gravimetry (DTG). All the polymers were soluble at room temperature in polar solvents such as N,N' -dimethylaceamide, N,N' -dimethyl formamide, dimethyl sulfoxide, and N-methyl-2-pyrrolidone.

Key Words: Polyamides, pyridyl moiety, hydantoin derivatives, direct polycondensation