A STUDY ON THE LYOTROPIC LIQUID CRYSTALLINE COPOLYAMIDE

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ABSTRACT

To improve the fibrillation phenomenon and processibility of poly(p-phenyleneterephthalamide) (PPD-T), a P/E copolyamide was prepared by introducing 4,4'-ethylene dianiline (EDA) into rigid chain backbone. The effects of semi-flexible segment on the liquid crystalline properties were investigated.

The EDA, used as a comonomer, was prepared by catalylitic reduction of p,p'-dinitrophenyl, obtained by oxidative coupling of p,p'-dinitrotoluene. Various high molecular weight P/E copolyamides were prepared by low temperature solution polycondensation of terephthaloyl chloride (TPC) with various mixtures of p-phenylene diamine (PPD) and EDA. The P/E copolyamides were completely dissolved in 100% sulfuric acid, and the phase transition of P/E copolyamide-sulfuric acid systems was examined in terms of concentration and temperature. Over the chemical compositions, P/E=9/1, 8/2, and 7/3, solutions of anisotropic single phase were acquired. In particular, the two mixing ratios, 9/1 and 8/2, gave a good anisotropic spinning dope.