High-Temperature Zone Drawing of Aromatic Polyamide Film (1)

- 6-amino-2-(4-aminophenyl)-4-phenyl quinoline/ oxydianiline/terephthaloyl chloride copolymer film -

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6-amino-2-(4-aminophenyl)-4-phenyl quinoline (QDA) as base diamine was copolymerized using terephthaloyl chloride (TPC) with oxydianiline (ODA) as second diamine to make isotropic aromatic polyamide film. The transparent and amorphous films were prepared with different QDA/ODA mole fractions. In order to orient the molecular chains of QDA/ODA films, high-temperature zone drawing method was applied at 250-450°C. The highest value of draw ratio was achieved at a mole fraction of 0.6/0.4 QDA/ODA. The films having inherent viscosity of 3.26 and mole fraction of 0.6/0.4 QDA/ODA were drawn at 250, 350, and 450°C, respectively. Maximum draw ratios of 1.5 at 250°C, 3.5-4 at 350°C, and 10-11 at 450°C, respectively, were obtained. From the fact that the crystal orientation index of the film drawn at 450°C was below 0.88, it was supposed that the effect of amorphous orientation is more predominant than that of crystal orientation. Tensile properties of the film increased with an increase in the draw ratio. The amount of fibrillation of the films was relatively lower than that of films hot drawn at same drawing temperature.