

Abstract: Influence of polymer modification on the structure formation and processing of PET-POY-yarns

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The influence of a modification of PET (via copolycondensation) on the thermal and on the stress-induced crystallization during yarn spinning was investigated. Copolyesters with different comonomers were synthesized by a standard polycondensation process. The thermal crystallization, which was investigated by DSC, showed that with increasing amount of comonomer the onset of crystallization is shifted to lower temperature, heat of crystallization is reduced and crystallization velocity is decreased. The copolyesters were meltspun at winding speeds from 3000 to 6000 m/min. Density and DSC measurements showed that the crystallization behaviour can be purposively influenced. With increasing amount of comonomer, the beginning of the stress induced crystallization occurs at higher winding speeds. The resulting degree of crystallinity is significantly decreased. For characterizing the amorphous orientation, chain-intrinsic polarized fluorescence was investigated. It could be proved that comonomer modification leads to a high orientation in amorphous regions. In practical use this modification could have potential to improve productivity.

The drawing of fibers spun at 4000 m/min is readily feasible. This indicates good processing properties of the modified fibers. The dyeing properties of the as-drawn fibers improve with increasing comonomer concentration. Copolyester fibers can be successfully dyed with disperse dyes at temperatures below 100°C.