

용액 결정성장하의 Nylon 4,6 의 결정구조 및 열적성질
(Crystal structure and thermal properties of solution
crystallized nylon 4,6)

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A B S T R A C T

Calorimetric (D.S.C.) studies were carried out on the nylon 4,6 single crystals grown from 1,4-butanediol solution at various crystallisation temperatures, based on the assessment of the lamellar thickness by small angle x-ray scattering. Samples were annealed mainly to get rid of residual solvents inside the crystals. The effect of annealing on the crystal perfection is inferred from the measured thermal properties of the crystals. According to the scanning rates less than 80 K/min., D.S.C. melting peaks indicate that changes in the internal morphology of nylon 4,6 crystal occur during the heating. Measurements on single crystals prepared at different crystallisation temperatures yield a thermodynamic melting temperature, T_m , of 319 °C, for the infinitely extended crystal after a plot of melting temperature (T_m) vs. reciprocal crystal thickness ($1/l$). The obtained heat of fusion value for the infinite crystal thickness, H_0 , was 270 J/g from the plot of measured heat of fusion (ΔH_m) vs. reciprocal crystal thickness ($1/l$). based on these values, the fold surface energy, δ_s , of 65.4 erg/cm² was obtained from Hoffman-Weeks equation. The thermodynamic melting temperature and heat of fusion of the infinite crystal thickness for the solution grown nylon 4,6 single crystals are found to be

higher than those of the reported corresponding solution grown nylon 6,6 single crystals. Obtained crystallinity from D.S.C. measurements ranges from 40 to 50 %, which is close to the reported value for the nylon 6,6 single crystals but lower than we expected.

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