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Comparative Determinations of Orientation in Injection-Molded Thermotropic Liquid Crystalline Copolyester (TLCP) Plaques ROBERT BUBECK, Michigan Molecular Institute, STANLEY RENDON, WESLEY BURGHARDT, Northwestern University, DANIEL FISCHER, NIST — Two-dimensional wide-angle X-ray scattering (2D-WAXS) in transmission and C K edge near edge X-ray adsorption fine structure (NEXAFS) spectroscopy were used to characterize anisotropy and catalog orientation states in injection-molded plaques fabricated under varying conditions using two commercial TLCP copolyesters. The observed 2D-WAXS patterns are usually bimodal in character due to contributions from the core and skin regions that result from extensional and shear flow, respectively, in the mold. Deconvolution of the 2D- WAXS patterns permits one to gain a measure of the Hermans orientation parameter of the core and skin for finite thicknesses of the plaques. The NEXAFS in partial electron yield mode is sensitive to the orientation of the molecular pi orbital of backbone phenyl groups of the top 3 nm of a surface. Updated analyses of the NEXAFS results indicate much greater localized molecular orientation at the very surface of the samples than for the more general orientations for the core and skin derived from the WAXS. The NEXAFS results are generally consistent with those obtained by using surface specific attenuated total reflectance Fourier transform infra-red spectroscopy.

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