Abstract Submitted
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Interface confinement induced order and orientation in thin films of Poly-Caprolactone[1] KOSSACK WILHELM, Molecular Physics, University Leipzig, Linnestr. 5, 04317 Leipzig, Germany, ANNE SEIDLITZ, THOMAS THURN-ALBRECHT, University Halle Wittenber, Halle-Saale, Germany, FRIEDRICH KREMER, Molecular Physics, University Leipzig, Linnestr. 5, 04317 Leipzig, Germany, DEUTSCHE FORSCHUNGSGEMEINSCHAFT, SFB TRR 102 COLLABORATION — Infrared-transition moment orientational analysis (IR-TMOA), X-ray Diffraction (XRD) measurements and model calculations are combined to study interface and confinement induced order and orientation in thin ($h = 11\mu$m) films of Poly-caprolactone (PCL) prepared by drop-casting on silicon wafers. Depending on the crystallization temperature, 303K ¡T_x¡ 333K, spherulites with a diameter of 1μm¡d_S¡500μm form. Macroscopic order of the crystalline lamellae is imposed by spatial confinement ($d_S > h$) and interfacial interactions and quantified by IR-TMOA and XRD pole figures. Both techniques rely on the relative orientation of sample and incident radiation, and measure, in case of PCL, the orientation distribution of complementary crystal directions. This allows to (1) correlate the directions of the transition moments with the crystal axes; and (2) estimate the volume fractions of flat- or edge on lamellae as induced by the different interfaces, as well as the fractions of surface-induced- or bulk-nucleated spherulites in dependence on T_x. The contribution of substrate induced spherulitic structures rises with $T_x = 323$ K up to $\sim$ 12vol%, whereas no indications of edge on lamellae at the free surface are found. At $T_x \leq 313$K the bulk phase dominates.

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