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SAXS/WAXS studies of shear-induced crystallization of poly(1-butene) MU SUNG KWEON, BINBIN LUO, WESLEY BURGHARDT, Northwestern University — Flow-induced crystallization of poly(1-butene) was studied in shear flow. Flow was produced using a Linkam shear cell that has been modified to allow x-ray access for in situ studies of polymer structure using synchrotron x-ray scattering techniques. After loading in the shear cell, samples were first heated well into the melt, and then cooled to a crystallization temperature selected such that negligible quiescent crystallization would occur on reasonable time scales. A short burst of shear flow was then applied at various rates, after which simultaneous wide- and small-angle x-ray scattering (WAXS and SAXS, respectively) data were collected to study the impact of both deformation rate and total applied strain on accelerated crystallization kinetics as well as the morphology of the resulting crystallites (e.g. degree of crystallite orientation). SAXS and WAXS data generally showed qualitative agreement in measures of the extent of crystallization and the degree of crystallite orientation. Average crystallite orientation was found to decrease over the course of crystallization. The crystalline volume fraction in the sample was calculated from the (i) SAXS invariant and (ii) integrated WAXS intensity profile to quantify the extent to which the sample crystallized at various flow c

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