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Chirality Information Transfer in Polylactides: From Main-Chain Chirality to Lamella Curvature ROBERT EMERY PRUD'HOMME, DAMIEN MAILLARD, University of Montreal — The behaviour of ultrathin polymer films is very different from that in the bulk phase. In this work, the crystallization of poly(D-lactide) (PDLA) and poly(L-lactide) (PLLA) was followed using in situ atomic force microscopy over a broad range of temperatures and thicknesses. Using a forced nucleation technique, edge-on lamellae were observed, showing a curvature which can be related to the polymer chirality. In the case of PLLA, the lamellae are S-shaped, contrary to the PDLA lamellae which are Z-shaped. This behaviour was also observed on TEM pictures of PLLA and PDLA films crystallized in the same conditions without any external nucleation. For the first time, a relationship has been established between the molecular chirality of poly(lactide)s and their macroscopic behaviour. Moreover, the rotating direction of those lamellae can be directly linked with the sense of twisting of the poly(lactide)s lamellae in banded spherulites. Those observations can lead to a model where the curved crystals in ultrathin films can be considered as half-lamellae, which, when associated together, give twisted complete lamellae.

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