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Is chain end retardation responsible for anomalous dependence of crystal growth rate on molecular weight? JESSICA L. CARVALHO, SARA L. CORMIER, NAN LIN, KARI DALNOKI-VERESS, Department of Physics & Astronomy and the Brockhouse Institute for Materials Research, McMaster University, Hamilton, ON, Canada, L8S 4M1 — We present results on a robust anomaly in the crystallisation of blends of poly(ethylene oxide) (PEO) of differing molecular weight, M_w . Previous studies probing PEO blends have mainly focused on blends of low M_w , for which integral chain folding is important, with very high M_w . The PEO samples used in this study consist of a blend with both M_w 's well above the integral chain folding limit. In general, one would expect that such blends should show a monotonic decrease in spherulite growth rate, G , as the blend contains more high- M_w component. Our results however show a clear non-monotonic G , with a minimum in a plot of G as a function of the volume fraction. Surprisingly, blending a small amount of lower- M_w PEO into a higher- M_w PEO slows the growth kinetics. We present a model that attributes this behavior to a chain end retardation mechanism.

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