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Crystallization of Bromine Substituted Polyethylenes with Precise Placement or Random Distribution[1] R.G. ALAMO, K. JEON, R.L. SMITH, FAMU-FSU College of Engineering, E. BOZ, K.B. WAGENER, Dept. of Chemistry, University of Florida — The crystalline properties of a series of bromine containing polyethylenes (PEs) with either a random or an exact placement of the Br atom on each and every 21^{st}, 19^{th}, 15^{th} and 9^{th} backbone carbon have been studied by DSC, NMR, Raman spectroscopy, WAXS and SAXS. Taking into account a larger strain due to the size of the Br atom, the crystallization behavior is analogous to Cl substituted PEs. While all precision Br-PEs crystallize as homopolymers as demonstrated by, 1. DDMAS solid-state ^{13}C NMR spectra; 2. development of relatively large crystal thickness, and 3. sharp crystallization and melting peaks, the development of the crystalline state in random analogues is led by selection of most crystalline sequences indicated by broad thermal transitions, and lower crystallinities. WAXS patterns are unique for each type of substitution. For precision Br-PEs WAXS contain reflections corresponding to planes containing the Br atoms which are tilted 35° in reference to the chain axis. Due to the accommodation of the large Br atom, the crystals of all precisely substituted Br-PEs studied are conformationally disordered as observed by their Raman and NMR spectra. In contrast, crystals from random analogues display negligible conformational disorder.

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