

Homework #1: Polymer physics

Due date: 2008/11/3

1. (a) Describe the differences between an amorphous and a semicrystalline polymer.

(b) Present experimental technique which can be used to differentiate between an amorphous and a semicrystalline polymer based on previous answer.

2. (a) Calculate the average end-to-end distance for polyethylene with $M = 10^7$ g/mol at 140°C under theta conditions. Compare this value with the contour length of these molecules.

(b) Flory's characteristic ratio C_n saturates at finite value C_∞ for large numbers of main-chain bonds ($n \rightarrow \infty$). Explain the physical origins of these results in terms of bond angles and steric hindrance)