

Homework 4

Chapter 3
5, 6

- 3.) Polymers crystallize in asymmetric lamellar crystallites with thickness of 50 to 100 Å and lateral dimensions of 1,000 to 10,000 Å. The crystalline c-axis is generally in the thin direction but reflections from all planes are generally very broad. In the context of the Scherrer equation (3-13 pp. 102) can this be explained?
- 4.) a.) Demonstrate how the parameter $q = 4 \sin(\theta) / \lambda$ is related to the momentum transferred when a neutron at velocity v interacts with a fixed nucleus to elastically change direction by an angle 2θ . Use Bragg's Law and equations from Appendix 2 pp. 499. ($q = 2\pi / \lambda$ from appendix 1 pp. 488.)
- b.) It is often said that expert diffractionists "think in inverse-space". By glancing at appendix 1 (pp. 480) and from class notes why might this be advantageous?