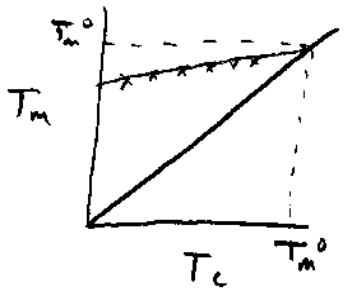
Crystallization Quiz

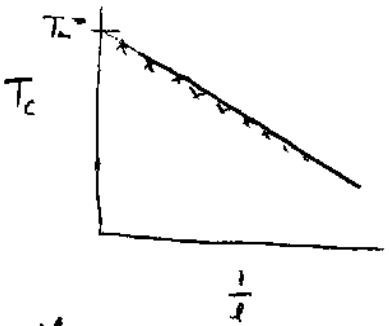
Solutions

1.) Make the following plot of melt temperature vs. crystallization temperature



T_m° is the temperature where $T_m = T_c$

2.) Measure the lamellar thickness from SAXS and plot:



extrapolate the curve until it intersects the y-axis at T_m°

3.) Make an Avrami plot by plotting $\log(-\ln(1 - X_c))$ vs. $\log t$. Compare the slope of the line with the tabulated values for the Avrami constant (n). Some knowledge about the crystallization process must be known to determine if the crystallites were formed in a homogeneous or heterogeneous manner

4.) The second regime is likely due to the effects of secondary crystallization that occurs after the impingement of the crystallites. This time is indicative of the average impingement time of the crystallites

5.) To maximize barrier, one wants to generate many small crystallites to form a more torturous path that would prevent water or oxygen from passing through the polymer. To do so, the polymer should be crystallized with as large a supercooling as possible without compromising the overall percent crystallinity of the polymer.