

14.3 We are asked to compute the degree of polymerization for polystyrene, given that the number-average molecular weight is 500,000 g/mol. The repeat unit molecular weight of polystyrene is just

$$\begin{aligned}m &= 8(A_C) + 8(A_H) \\ &= (8)(12.01 \text{ g/mol}) + (8)(1.008 \text{ g/mol}) = 104.14 \text{ g/mol}\end{aligned}$$

Now it is possible to compute the degree of polymerization using Equation 14.6 as

$$DP = \frac{\bar{M}_n}{m} = \frac{500,000 \text{ g/mol}}{104.14 \text{ g/mol}} = 4800$$