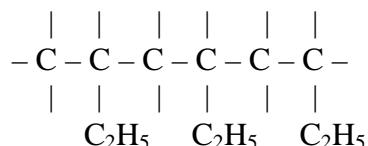


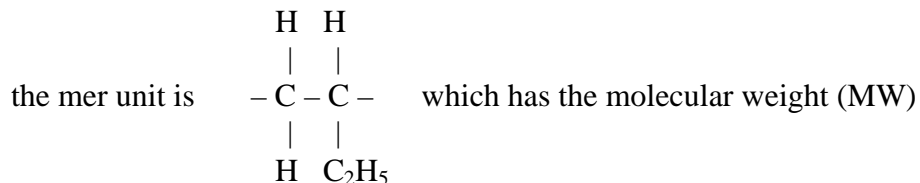
3.091 Fall Term 2004
Homework Quiz #12B
 solution outline

Butene, $\text{H}_2\text{C}=\text{CH}-\text{CH}_2-\text{CH}_3$, can be reacted to form isotactic polybutene (PB).

(a) Draw a trimer of isotactic PB.



(b) What is the value of the degree of polymerization, n , of isotactic PB with a molecular weight of 3.091×10^5 g/mol?



$$(4 \times 12 \text{ for C}) + (8 \times 1 \text{ for H}) = 56 \text{ g/mol}$$

$$\therefore n = 3.091 \times 10^5 \text{ g/mol} / 56 \text{ g/mol} = 5520$$

(c) Is isotactic PB a thermoset or a thermoplastic? Explain.

PB is a thermoplastic. It is a linear chain molecule. Only weak van der Waals bonds hold the solid together. Raising the temperature will loosen these bonds and allow the chains to flow without damage to the covalently bonded primary structure.