

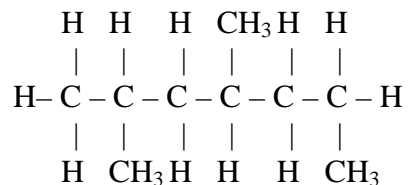
3.091 Fall Term 2007

Homework Quiz #11B

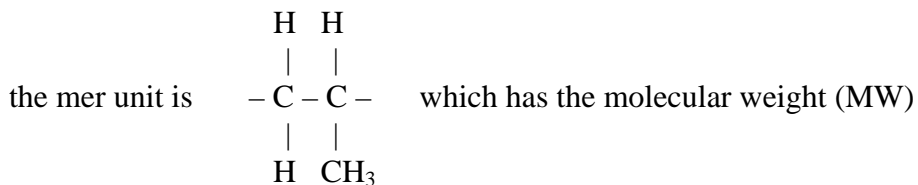
solution outline

Propylene or propene, $\text{H}_2\text{C}=\text{CH}-\text{CH}_3$, can be reacted to form isotactic polypropylene (PP), a rigid polymer used, among other things, to make stackable chairs.

(a) Draw a trimer of syndiotactic polypropylene.



(b) What is the value of the molecular weight in g/mol of for syndiotactic polypropylene with a degree of polymerization, n , of 3091?



$$(3 \times 12 \text{ for C}) + (6 \times 1 \text{ for H}) = 42 \text{ g/mol}$$

$$\therefore \text{MW (sPP}_{3091}) = 3091 \times 42 = 1.30 \times 10^5 \text{ g/mol}$$

(c) Which material do you expect to be the more viscous: syndiotactic polypropylene or polyethylene ($-\text{CH}_2-\text{CH}_2-$)? Explain.

PE is more fluid than sPP owing to simpler sidegroups in PE which means less resistance to flow for PE