



Type and definition of reaction:	Example	Reaction equation, structural formulas, names, conditions:
6. <u>Esterification</u> (pg. 1030) The condensation reaction that joins an alcohol with a carboxylic acid to produce an ester.	producing isopentyl acetate	$  \begin{array}{c}  \text{H}_3\text{C} \\    \\  \text{CH}-\text{CH}_2 \\    \quad   \\  \text{H}_3\text{C} \quad \text{CH}_2-\text{OH}  \end{array}  + \text{HO}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3  \xrightarrow[\text{heat}]{\text{H}^+}  \begin{array}{c}  \text{H}_3\text{C} \\    \\  \text{CH}-\text{CH}_2 \\    \quad   \\  \text{H}_3\text{C} \quad \text{CH}_2-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3  \end{array}  + \text{H}_2\text{O}  $ <p>3-methyl-1-butanol      ethanoic acid      3-methylbutyl ethanoate      water (isopentyl alcohol)      (acetic acid)      (isopentyl acetate)</p>
7. <u>Polymerization</u> The conversion of “monomers” into “polymers”. I.e. the joining of small molecules to form large molecules with repeating units.		
a) addition (pg. 1023)	eth(yl)ene	$  \text{H}_2\text{C}=\text{CH}_2 \xrightarrow{\text{catalytic process}} \dots \text{CH}_2 \left[ \overset{\text{monomer}}{\text{CH}_2-\text{CH}_2} \right]_n \text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2 \dots  $ <p style="text-align: center;">polyeth(yl)ene</p>
b) condensation (pg. 1031)	General Reaction (for Dacron replace R <sub>1</sub> with -CH <sub>2</sub> -CH <sub>2</sub> - and R <sub>2</sub> with benzene.	$  \text{HO}-\text{R}_1-\text{OH} + \text{HO}-\overset{\text{O}}{\parallel}{\text{C}}-\text{R}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH} \longrightarrow \dots \left[ \text{R}_1-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\text{R}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{O} \right]_n \text{R}_1 \dots + \text{H}_2\text{O}  $ <p style="text-align: center;">diol      dicarboxylic acid      polyester      + H<sub>2</sub>O (ethylene glycol)      (terephthalic acid)      (Dacron)</p>
8. <u>Oxidation</u> (pg. 1028) (More) oxygen atoms are placed on an organic molecule.	ethanal + K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	$  \begin{array}{c}  \text{H} \quad \text{O} \\    \quad    \\  \text{H}-\text{C}-\text{C}-\text{H} \\    \\  \text{H}  \end{array}  + \text{K}_2\text{Cr}_2\text{O}_7 \xrightarrow[\text{room temp.}]{\text{H}_2\text{SO}_4} \begin{array}{c}  \text{H} \quad \text{O} \\    \quad    \\  \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\    \\  \text{H}  \end{array}  + \text{Cr}_2(\text{SO}_4)_3 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}  $ <p style="text-align: center;">ethanoic acid</p>

1. Define addition reaction. Which of these reactions are addition reactions? Which reaction is the opposite of an addition reaction?
2. Define condensation reaction. Which of these reactions are condensation reactions?
3. Based on these reactions how could you make the following chemicals (draw reaction, showing reactants, products and conditions. Also indicate the type of reaction): 1,2-dichlorocyclopentane, octane (using 4-octyne), 2,2,3,3-tetrabromopentane, 1-butene, propanoic acid, ethanol, ethyl propanoate.