

# Reactions of Alkenes

<u>Product</u>	<u>Type of Reaction (name)</u>	<u>Reaction Conditions</u>	<u>Regiochemistry</u>	<u>Stereochemistry</u>
<b>Halides</b> (Ch. 6.9) (Ch. 7.10)	<u>Electrophilic Addition</u> <u>Radical Chain</u> radical addition	HX, organic solvent (anhydrous) HBr, $\text{H}_2\text{O}_2$ , h	Markovnikov Addition Anti-Markovnikov	No stereochemical pref. No stereochemical pref.
<b>Dihalides</b> (Ch. 7.2)	<u>Electrophilic Addition</u>	$\text{Cl}_2$ , $\text{Br}_2$ , $\text{I}_2$ in $\text{CCl}_4$ solvent	Markovnikov-like	Anti stereochemistry
<b>Halohydrin</b> (Ch. 7.3)	<u>Electrophilic Addition</u>	$\text{X}_2$ in $\text{H}_2\text{O}$ (X=Cl, Br, I) NBS or NCS in $\text{H}_2\text{O}/\text{DMSO}$	Markovnikov-like Markovnikov-like	Anti stereochemistry Anti stereochemistry
<b>Alcohol</b> (hydration) (Ch. 7.4) (Ch. 7.4) (Ch. 7.5)	<u>Electrophilic Addition</u> oxymercuration hydroboration	$\text{H}_3\text{O}^+$ 1. $\text{Hg}(\text{OAc})_2$ , $\text{H}_2\text{O}$ , THF 2. $\text{NaBH}_4$ 1. $\text{BH}_3$ , THF 2. $\text{H}_2\text{O}_2$ , NaOH, $\text{H}_2\text{O}$	Markovnikov Addition Markovnikov Addition Anti-Markovnikov	No stereochemical pref. No stereochemical pref. Syn Stereochemistry
<b>Cyclopropanes</b> (Ch. 7.6)	<u>Electrophilic Addition</u> Simmons-Smith Reaction	$\text{CHCl}_3$ , NaOH $\text{CH}_2\text{I}_2$ , $\text{Zu}(\text{Cu})$		Syn addition Syn addition
<b>Alkanes</b> (Ch. 7.7)	<u>Reduction (Addition)</u> catalytic hydrogenation	$\text{H}_2$ , Pd (C), solvent		Syn stereochemistry
<b>1,2-Diols (glycols)</b> (hydroxylation) (Ch. 7.8)	<u>Oxidation (Addition)</u> osmylation	1. $\text{OsO}_4$ , pyridine 2. $\text{NaHSO}_3$		Syn addition
<b>Carbonyls</b> (Ch. 7.8) (Ch. 7.8)	<u>Oxidative Cleavage</u> Ozonolysis	1. $\text{O}_3$ 2. $\text{Zn}, \text{H}_3\text{O}^+$ $\text{HIO}_4$ , $\text{H}_2\text{O}$ , THF	(Cleavage of alkenes only to give aldehydes and/or ketones) (Cleavage of 1,2-diols only to give aldehydes and/or ketones)	