

Terms to know

Markovnikov's rule

in **addition reactions**, the proton is added to the carbon atom with the **greatest** number of hydrogen atoms attached to it

anti-Markovnikov's rule

in **addition reactions**, the proton is added to the carbon atom with the **lowest** number of hydrogen atoms attached to it

zaitsev's rule

in **elimination reactions**, the major product is the **more stable** alkene with the **highly substituted** double bond

M, Anti-M and V

[link text](#)

Elimination Reactions

E1

multistep,

E2

single step,

Terms

Protic

Solvents with O-H or N-H bonds and the ability to hydrogen bond

Aprotic

Solvents that don't

Nucleophile

A simple metal and salt, nucleus "loving", usually anions

Electrophile

Must contain a C-LG bond, electron "loving", usually cations

Solvolysis Reaction

the nucleophile is also the solvent

Terms (cont)

E/Z System

1. Prioritize the 2 groups attached to each carbon relative to one another. If the higher priority groups are **cis**, its **Z**, if their **trans**, its **E**

Terms

Vicinal

2 atoms or groups bonded to same carbon

Geminal

2 atoms or groups bonded to the same side of the carbon

syn-addition

added to same plane or same side of compound

anti-addition

added to different sides of compounds

Geminal vs Vicinal

[link text](#)

Anti vs Syn

[link text](#)

Substitution Reactions

SN1

2 step, RR possible, tertiary reacts fastest

SN2

1 step, no RR, Primary reacts fastest

Elimination and Substitution Flowchart

[link text](#)

Addition Reactions

Names of Reaction	Kind of Reactant	Whats on Arrow	Product structure
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Addition Reactions (cont)

Catalytic Hydrogenation	Alkene	H ₂ , Ni, Pt or Pd	alkane, M not applicable, syn, No RR
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Addition of hydrogen halides	Alkene	H-X	M, No syn/anti, possible
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Acid Catalyzed hydration	Alkene	H ₂ SO ₄ or H ⁺ , H ₂ O	New H added, M, no syn/anti, possible
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Hydroboration-Oxidation	Alkene	1. B ₃ H ₆ , 2. H ₂ O, -OH	New H added, Anti-M, Syn, no RR
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Addition of Halogens/halogenation	Alkene	X ₂ , CH ₃ Cl	new vicinal halogens, not applicable, Anti, No RR
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Cohalogenation	Alkene	Br ₂ , H ₂ O	new halogen added, OH, M of OH and Anti-M for halogen, Anti, No RR
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Expoxidation	Alkene	RCOOH (peroxide)	Expoxide formed, M not applicable, Syn, No RR
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Ozonolysis	Alkene	1. O ₃ , 2. H ₂ O	2 carbonyl compounds, nothing else applicable
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M=Markovnikov's Rule

Anti-M= Anti-Markovnikov's Rule

RR=Rearrangement