

Alkene Reactions

| Notes | | Reaction | Reagent(s) | Product(s) |
|--------------------------------------|----|--------------------------------------|--|----------------------|
| | 1. | Addition, Hydrogen (Reduction) | H ₂ (Ni, Pd, Pt) | Alkanes |
| Anti | 2. | Addition, Halogens | X ₂ , CCl ₄ | Dihalides |
| Carbocations Markovnikov | 3. | Addition, Hydrogen Halides | HX | Alkyl Halides |
| Carbocations Markovnikov | 4. | Addition, Sulfuric Acid | H ₂ SO ₄ | Alkyl Sulfates |
| Carbocations Markovnikov | 5. | Addition, Water (Hydration) | H ₂ O, H ⁺ | Alcohols |
| X is Electrophile, Markovnikov | 6. | Addition, Aqueous Halogens | X ₂ (aq) | Alcohols with Halide |
| Markovnikov | 7. | Oxymercuration- Demercuration | H ₂ O or ROH, Hg(OAc) ₂ or (Hg(TFA) ₂ ; then NaBH ₄ | Alcohols or Ethers |
| Anti- Markovnikov | 8. | Hydroboration- Oxidation | (BH ₃) ₂ ; then H ₂ O ₂ , NaOH | Alcohols |
| Anti- Markovnikov | 9. | Addition, Free Radical | HBr, Peroxide | Alkyl Halides |

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| | 10. | Addition, Carbenes | CH ₂ CO or CH ₂ N ₂ or CHCl ₃ , t-BuOK & hν | 3 Membered Rings |
| | 11. | Epoxidation | PBA (C ₆ H ₅ CO ₃ H) | Epoxides |
| | 12. | Hydroxylation | KMnO ₄ , Syn HCO ₃ H, Anti | Diols |
| | 13. | Allylic Hydrogenation | X ₂ , □ or NBS | Alkenes with Halide |
| | 14. | Ozonolysis | O ₃ : then Zn, H ₂ O | =CH ₂ → O=CH ₂ (formaldehyde) =CHR → O=CHR (aldehyde) =CHR ₂ → O=CR ₂ (ketone) |
| | 15. | Vigorous Oxidation | KMnO ₄ , □ | =CH ₂ → CO ₂ (carbon dioxide) =CHR → RCO ₂ H (carboxylic acid) =CR ₂ → O=CR ₂ (ketone) |