

9: Formation of Alkenes and Alkynes. Elimination Reactions

Preview

9.1 Elimination Reactions

Common Features of Elimination Reactions (9.1A)

General Equations.

Haloalkane Substrates.

Mechanisms for Elimination of H-X (9.1B)

The E2 Mechanism.

The E1 Mechanism.

Stereochemistry of E1 and E2 Elimination (9.1C)

E2 Elimination.

E1 Elimination.

Other Elimination Reactions (9.1D)

The E1cb Mechanism.

Elimination of X-X.

α -Elimination to form Carbenes. (to be added later)

9.2 Mechanistic Competitions in Elimination Reactions

Substitution Competes with Elimination (9.2A)

S_N1 and E1 Reactions Compete.

S_N2 and E2 Reactions Compete.

Nucleophile versus Base.

E1 and E2 Reactions Can Compete (9.2B)

E1 and E2 with 3° Haloalkanes.

Strongly Basic Nucleophiles Favor E2 Over E1.

Different Alkene Products (9.2C)

Effect of Alkene Stability.

Zaitsev's Rule.

Other Halide Leaving Groups (9.2D)

Relative Reactivity.

Alkene Product Distribution.

The Type of Base (9.2E)

Alkoxide and Amide Ions.

Effect on E2/S_N2 Competition.

Other Bases.

The Solvent and The Temperature (9.2F)

Solvents.

Temperature.

9.3 Alkynes and Allenes from Haloalkanes

Dehydrohalogenation (9.3A)

Different Alkyne Products (9.3B)

Elimination of X-X (9.3C)

(continued)

9.4 Alkenes from Alcohols

Acid Catalyzed Dehydration (9.4A)

H₂SO₄ or H₃PO₄.

Dehydration Mechanism.

Alcohol Structure.

Substitution Can Compete.

Rearranged Alkene Products (9.4B)

Carbocation Rearrangements.

1° Alcohol Dehydration.

Rearrangements of Carbocations from Other Sources.

Other Dehydration Reagents (9.4C)

Alkynes Are Not Formed by Alcohol Dehydration (9.4D)

9.5 Alkenes from Amines

Quaternary Aminium Hydroxides (9.5A)

Hofmann Amine Degradation.

Alkene Product.

Amine Oxides Give Alkenes (9.5B)

Chapter Review