Chapter 2
Organohalides Substitution and Elimination Reactions

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ABSTRACT

Substitution and elimination are considered the most important types of reactions in organic chemistry. Substitution reactions are chemical reactions that involve the replacement of one functional group in a molecule or ion with another functional group. During the substitution, the bond between the functional group and the reactive centre is broken, and a new bond forms between that centre and the new functional group. On the other hand, elimination reactions are a type of organic chemical reaction in which a pair of atoms or groups are removed from a molecule. It is the primary process by which organic compounds with only one carbon-carbon bond (saturated compounds) are converted to compounds with two or three carbon-carbon bonds (unsaturated compounds). It is the primary process by which organic compounds with only one carbon-carbon bond (saturated compounds) are converted to compounds with two or three carbon-carbon bonds (unsaturated compounds).

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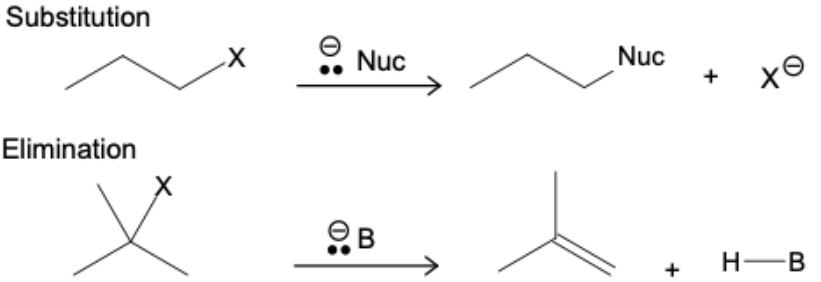
INTRODUCTION TO SUBSTITUTION AND ELIMINATION REACTIONS

This chapter will specifically examine the reactions of alkyl halides, which are compounds that contain halogens (such as Cl, Br, I) bonded to a carbon atom that is sp^3 hybridized. Alkyl halides typically undergo two broad categories of reactions (Figure 1) (Murry, 1977). When subjected to a nucleophile, an alkyl halide has the ability to undergo a substitution reaction, wherein the halogen is replaced by the nucleophile. When subjected to a base, an alkyl halide has the potential to undergo an elimination reaction, resulting in the formation of a *pi* bond, specifically an alkene.

Figure 1. Possible reactions of alkyl halide



Due to the dual nature of certain reagents, such as hydroxide ion (OH^-), they can act as both nucleophiles and bases. As a result, substitution and elimination reactions frequently occur simultaneously, leading to competition between the two, as demonstrated in the example (Figure 2) (Steigman, 1937). This chapter will examine substitution and elimination reactions, as well as the factors that determine the competition between these reactions.