

## Editorial on Conjugated Systems and Pericyclic Reactions

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### EDITORIAL

The suprafacial (same-face presence of the system or isolated orbital in the process) interaction of a 4 electron system with a 2 electron system drives the Diels-Alder reaction mechanism. The cycloaddition reactions used in the Diels-Alder reaction result in the formation of a new ring from two reactants.

The 4 electron system in the Diels-Alder reaction refers to the diene structure, while the 2 electron system refers to the dienophile structure. Because of the imposition of orbital symmetry, this interaction now leads to a transition state with no additional energy barrier.

#### What is the Diels-Alder Reaction, and how does it work?

A substituted alkene and a conjugated diene are the reactants in the Diels-Alder reaction, which is an essential organic chemical reaction. Dienophile is a term used to describe a substituted alkene. This reaction produces a cyclohexene substituted derivative. The Diels-Alder reaction is an excellent example of pericyclic reactions that are carried out by organised mechanisms (i.e. all bond breakage and bond formation occurs in a single step).

The German chemists Otto Diels and Kurt Alder discovered this reaction in 1928, for which they were awarded the Nobel Prize in Chemistry in 1950. Since two new carbon-carbon bonds are formed simultaneously, the Diels-Alder reaction can be used to form six-membered rings.

#### Diels-Alder Reaction Mechanism

The reaction is thermodynamically advantageous since pi bonds are converted into stronger sigma bonds. Electrophilic dienophiles with electron-withdrawing groups are good candidates for the Diels-Alder reaction. Nucleophilic dienes with electron-donating groups are also fond of it. A few examples of good dienes and dienophiles for the Diels-Alder reaction are described below.

The Diels-Alder reaction is a single-step cycloaddition reaction because the Diels-Alder reaction mechanism is concerted. A cyclic adduct is created when two unsaturated molecules combine. Bond multiplicity has decreased in net terms. Bond formation and bond dissolution occur at the same time. The simple reaction mechanism is depicted in the diagram below.

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