A pericyclic reaction is a concerted reaction in which the number of rings in the transition state is greater than the total number of rings in the reactant molecules.

eg: Cope Rearrangement

\[
\begin{align*}
\text{ reactant } & \quad \Delta \quad \text{ transition state } \\
\text{ reactant } & \quad \text{ transition state }
\end{align*}
\]

- # covalent bonds broken = 3
- # covalent bonds formed = 3
- # covalent bonds broken + # covalent bonds formed = 3 + 3 = 6
- # steps = 1

Thus, the reaction is a concerted reaction. The transition state of the reaction can be drawn roughly as follows.

\[
\begin{align*}
\text{ reactant molecule } & \quad \text{ transition state } \\
\text{ rings in the reactant molecule } & = 0 \\
\text{ rings in the transition state } & = 1 \\
\text{ rings in the transition state } & > \text{ rings in the reactant molecule}
\end{align*}
\]

Thus, the reaction is a pericyclic reaction. For more examples of pericyclic reactions, see Cope elimination, Claisen rearrangement, Diels-Alder reaction

Contributors

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