According to Brønsted-Lowry theory, only a species containing at least one hydrogen atom has the potential to act as an acid in a reaction. Lewis theory is an attempt to extend the concept of acidity beyond species containing hydrogen. According to Lewis theory, in a reaction, a species that accepts a pair of electrons to form a new covalent bond is an acid, and a species that contributes a pair of electrons toward a new covalent bond is a base.

eg. 1:

\[
\begin{align*}
\text{BF}_3 + \text{F}^- \quad &\quad \text{F}^- \quad \text{BF}_3 \\
\text{Lewis acid} &\quad \text{Lewis base}
\end{align*}
\]

In this reaction, BF\(_3\) accepts a pair of electrons from F\(^-\) to form a new covalent bond and, therefore, acts as an acid; F\(^-\) contributes a pair of electrons toward a new covalent bond with BF\(_3\) and, therefore, acts as a base.

In a reaction a species that acts as an acid according to Lewis theory is called a Lewis acid and a species that acts as a base a Lewis base.

eg. 2:

\[
\begin{align*}
\text{H:C} &\quad \text{H} \quad \text{O}\quad \text{H} \\
\text{Lewis acid} &\quad \text{Lewis base}
\end{align*}
\]

Contributors

- Gamini Gunawardena from the OChemPal site (Utah Valley University)