The rate law provides the stoichiometry of the rate-limiting transition structure relative to the reactants.

\[ A + B + C \xrightarrow{k_{\text{obsd}}} \text{product} \]

\[ \frac{d[\text{product}]}{dt} = k_{\text{obsd}}[A]^1[B]^2[C]^0 \]

\[ [\text{AB}_2]^+ \]
First-Order Kinetics -- A Tutorial

\[ A \xrightarrow{k_{\text{obsd}}} P \]

\[-\frac{d[A]}{dt} = k_{\text{obsd}}[A]\]

\[ [A] = [A_0]e^{-k_{\text{obsd}}t} \]

Initial rate \( \propto [A_0] \)

Time

[A]

[A] vs. time

Initial rate vs. [A₀]
Zeroth-Order Kinetics -- A Tutorial

Large excess

\[ \text{B} \xrightarrow{\text{slow}} \text{B}^* \]

\[ \text{B}^* + \text{A} \xrightarrow{\text{fast}} \text{P} \]

\[- \frac{d[A]}{dt} = k_{\text{obsd}} \]

At different initial concentrations…

\[ [A] \]

slope

\[ [A_0] \]
Fractional reaction orders in LDA reveal deaggregations.
Solvents are ligands, not just reaction media.

\[ k_{\text{obsd}} = k'[\text{solvent}]^1 \]
Solvents are ligands, not just reaction media.

\[ k_{\text{obsd}} = k'[\text{solvent}]^0 \]
Solvents are ligands, not just reaction media.

\[
k_{\text{obsd}} = k'[\text{solvent}]^{-1}
\]
Multiple reaction pathways are common.

\[ k_{\text{obsd}} = k'[S]^1 + k''[S]^0 \]