Introduction to Reaction Kinetics

Reaction kinetics is the study of the rates at which chemical processes occur. It helps us understand how different conditions affect the speed of a reaction.

Factors Affecting Reaction Rates

Temperature, concentration, surface area, and catalysts can all influence how fast a reaction takes place.

Rate Laws

The rate law expresses the relationship between the rate of a chemical reaction and the concentration of its reactants.

Order of Reactions

Reaction order defines how the rate is affected by the concentration of each reactant. It can be zero, first, or second order.

Determining Reaction Order

Reaction order is determined experimentally using methods such as the method of initial rates.

The Arrhenius Equation

This equation shows the dependence of the rate constant on temperature and activation energy.

Catalysis

Catalysts increase the rate of a reaction by lowering the activation energy without being consumed in the reaction.

Reaction Mechanisms

A mechanism is a detailed step-by-step description of how a reaction occurs at the molecular level.

Elementary Reactions

An elementary reaction is a single step in a reaction mechanism and describes a direct interaction between reactants.

Integrated Rate Laws

These laws allow us to calculate concentrations of reactants at any time during the reaction process for different orders.