

Order of reaction:

Order of a simple reaction is the number of molecules or atoms whose concentrations change because of chemical reaction.

Mathematically "The sum of powers to which the concentration terms are raised in the rate law expression is called order of reaction.

Example: $aA + bB \rightarrow cC + dD$

Rate of reaction = $k[A]^m [B]^n$

The exponents m and n are known as the order of the reaction with respect to A and B respectively. **$m + n$ gives the overall order of the reaction.**

m and n **may and may not be equal to stoichiometric coefficients a and b** respectively in the net reaction.

But, in general when ever we consider stoichiometric coefficients as the order of reaction but in reality, order of reaction is calculated experimentally.

If overall order of reaction is equals to zero – it is called **zero** order reaction

order of reaction is equals to One – it is called **first** order reaction

order of reaction is equals to two – it is called **second** order reaction

Rate for a Reversible reaction:

For a reversible reaction say $A + B \rightleftharpoons C + D$

The net rate of reaction is given as $\frac{dx}{dt} = K_1[A][B] - K_2[C][D]$

The first factor $K_1[A][B]$ predicts the forward reaction rate and the second factor predicts the back-ward reaction rate. Also, at equilibrium

$\frac{dx}{dt} = 0$, because rate of forward reaction is equal to rate of backward reaction at equilibrium.