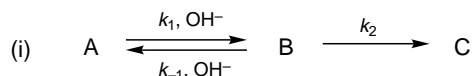


kinetic equivalence

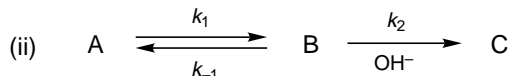
Two reaction schemes are kinetically equivalent if they imply the same *rate law*.

For example, consider the two schemes (i) and (ii) for the formation of C from A:



Providing that B does not accumulate as a *reaction intermediate*.

$$\frac{d[C]}{dt} = \frac{k_1 k_2 [A][\text{OH}^-]}{k_2 + k_{-1}[\text{OH}^-]} \quad (1)$$



Providing that B does not accumulate as a reaction intermediate:

$$\frac{d[C]}{dt} = \frac{k_1 k_2 [A][\text{OH}^-]}{k_{-1} + k_2[\text{OH}^-]} \quad (2)$$

Both equations for $d[C]/dt$ are of the form:

$$\frac{d[C]}{dt} = \frac{r [A][\text{OH}^-]}{1 + s [\text{OH}^-]} \quad (3)$$

where r and s are constants (sometimes called ‘coefficients in the rate equation’). The equations are identical in their dependence on concentrations and do not distinguish whether OH^- catalyses the formation of B, and necessarily also its reversion to A, or is involved in its further transformation to C. The two schemes are therefore kinetically equivalent under conditions to which the stated provisos apply.

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