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catalytic coefficient

If the rate of reaction, v, is expressible in the form:

$$v = \left(k_0 + \sum_i k_i \left[C_i\right]^{n_i}\right) [\mathrm{A}]^{\alpha} [\mathrm{B}]^{\beta} \ldots$$

where A, B, ... are reactants and C_i represents one of a set of catalysts, then the proportionality factor k_i is the catalytic coefficient of the particular catalyst C_i. Normally the partial order of reaction n_i with respect to a catalyst is unity, so that k_i is an $(\alpha + \beta + \ldots + 1)$th order rate coefficient. The proportionality factor k_0 is the $(\alpha + \beta + \ldots)$th order rate coefficient of the uncatalysed component of the total reaction. For example, if there is catalysis by hydrogen and hydroxide ions, and the rate constant can be expressed in the form:

$$k = k_0 + k_{\mathrm{H^+}} [\mathrm{H^+}] + k_{\mathrm{OH^-}} [\mathrm{OH^-}],$$

then k_{H^+} and $k_{\mathrm{OH^-}}$ are the catalytic coefficients for $\mathrm{H^+}$ and $\mathrm{OH^-}$, respectively. The constant k_0 relates to the uncatalysed reaction.

Source:
PAC, 1996, *68*, 149 *(A glossary of terms used in chemical kinetics, including reaction dynamics (IUPAC Recommendations 1996))* on page 156
PAC, 1994, *66*, 1077 *(Glossary of terms used in physical organic chemistry (IUPAC Recommendations 1994))* on page 1093

