**Gibbs energy of activation (standard free energy of activation),** $\Delta^{\ddagger}G^{o}$

The standard *Gibbs energy* difference between the *transition state* of a reaction (either an *elementary reaction* or a *stepwise reaction*) and the ground state of the reactants. It is calculated from the experimental rate constant $k$ *via* the conventional form of the absolute rate equation:

$$\Delta^{\ddagger}G = RT[\ln(k_B/h) - \ln(k/T)]$$

where $k_B$ is the Boltzmann constant and $h$ the Planck constant ($k_B/h = 2.08358 \times 10^{10}\ K^{-1}\ s^{-1}$). The values of the rate constants, and hence Gibbs energies of activation, depend upon the choice of concentration units (or of the thermodynamic standard state).

See also *enthalpy of activation, entropy of activation.*

1994, *66,* 1118; 1996, *68,* 166