PHYSICAL CHEMISTRY

GENERAL EDITOR Ya. GERASIMOV

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ИЗДАТЕЛЬСТВО
МИР

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КУРС ФИЗИЧЕСКОЙ ХИМИИ

ТОМ II

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This book is the second volume of a university course in physical chemistry, and deals with the fundamentals of chemical kinetics, catalysis and electrochemistry.

It is designed for students of chemical faculties of universities. It will also be useful for postgraduate students and teachers of physical chemistry.

TO THE READER

Mir Publishers would be grateful for your comments on the content, translation and design of this book. We would also be pleased to receive any other suggestions you may wish to make.

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CONTENTS

LIST OF TABLES

SYMBOLS[1]

A	activity of catalyst; area; constant; Helmholtz energy; mass of gramme-ion; mass efficiency of catalyst
a	activity; amount of substance; mean effective diameter of ions; number of gramme-atoms per mole; number of molecules of product; specific activity of catalyst
B	constant
b	amount of substance
C	capacitance; constant
c	amount of poison adsorbed by catalyst; cell constant; concentration; velocity of light
D	absorbed radiation dose; diffusion coefficient; energy of dissociation
d	distance; path of ionizing particle in irradiated substance
E	electric field strength
E	activation energy; e.m.f.; energy; potential difference; potential gradient
e	base of natural (Naperian) logarithms; charge of electron [2]; charge of particle; electron
F	Faraday constant; force
f	activity coefficient, mole-volume concentration basis; activity function of water ions; force; force constant; fugacity
G	conductance; Gibbs energy; radiation-chemical yield
H	enthalpy; heat of reaction
I	current intensity; energy of ionization; induction factor; intensity of light; ionic strength of solution; ionization potential; moment of inertia
i	empirical coefficient
J	rate of reaction
j	current density
K	activity product; cell constant; dissociation constant; electrolytic dissociation constant; equilibrium constant; hydrolysis constant; ionic product of water; relative temperature coefficient of conductivity; solubility product
k	Boltzmann constant; difference between standard potentials; rate constant [1]; dissociation function; molecule adsorption coefficient

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[1] In the English translation of this book the recommendations contained in the *Manual of Symbols and Terminology for Physicochemical Quantities and Units* adopted by the IUPAC Council at Cortina d'Ampezzo, Italy, on July 7, 1969 (see *Pure and Applied Chemistry*, Vol. 21, No. 1, 1970) have been used wherever possible. —*Translator's note*.

[2] The symbol q_e is used when necessary to avoid confusion with the symbol *e* for the base of natural logarithms.

[1] The symbol k_r is used instead of *k* when necessary to avoid confusion with the symbol *k* for the Boltzmann constant.

L	constant; length of chain
l	critical distance; distance from beginning of reaction zone; length; thickness of diffuse layer
M	mass of mole; molecular mass
m	mass; number of molecules; rate of flow of mercury
N	number of molecules; number of particles
N_A	Avogadro constant
n	amount of substance; number of gramme-ions; number of kilomoles; number of molecules of intermediate; order of reaction with respect to intermediate; quantum number
P	decrease in electrolyte; impulse of rotation; probability; steric factor; total pressure
p	dipole moment; impulse; power of adsorbed radiation dose; pressure
$\overline{p}$	momentum
Q	heat; partition function; quantity of heat; quantity of light
$\overline{Q}$	heat effect of reaction
q	electric charge
R	gas constant; resistance
r	activity of one n-atomic ensemble; distance between ions; distance between particle centres; total content of isotope molecules in a given system
S	entropy; surface
s	factor
T	absolute temperature
t	temperature, °C; time; transport number
U	internal energy; mobility of ion; potential difference
u	absolute mobility; concentration of intermediate; linear velocity; power of electrical discharge
u'	velocity of cation
V	mobility of ion; rate of flow of a gas; relative velocity of molecule; Volta potential; volume
v	absolute mobility; partial volume of solvent in solution; velocity; volume of mole
v'	velocity of anion
W	work
x	degree of transformation (amount of reacted substance); mole fraction (amount of substance in moles)
Z	number of collisions; number of migration regions; number of molecules
z	charge number (charge of ion); factor
α (alpha)	anharmonic ratio; coefficient; degree of dissociation; factor; heat transfer coefficient; most probable velocity of molecule; poisoning coefficient; probability; single separation coefficient
β (beta)	constant; diffusion rate constant; fraction hydrolyzed
γ (gamma)	activity coefficient; interfacial tension; quantum yield; temperature coefficient of reaction rate
Δ (delta)	degree of transformation; Lalacian operator; mean migration area
δ	distance; interval; probability of a cycle; thickness
ε (epsilon)	energy of molecule; energy required for photochemical dissociation; liquid junction potential; relative permittivity
η (eta)	overvoltage; thermal efficiency; viscosity; viscosity factor
θ (theta)	fractional (surface) coverage
$\varkappa$ (kappa)	conductivity; factor; number of intermediate molecules
Λ (lamba)	equivalent conductivity
λ	heat of adsorption; mean free path of molecule; wavelength
μ (mu)	chemical potential;dipole moment of molecule; number of primary elementary reactions; reduced mass of molecule
ν (nu)	electrochemical potential; frequency; latitude; number of catalyst atoms per migration region; number of ions in dissociation of a molecule;

	stoichiometric coefficient
Π (pi)	osmotic pressure; product
π	ratio of circumference to diameter of circle, 3.14159
ρ (rho)	charge density; density; resistivity
Σ (sigma)	sum
σ	collision diameter; diameter of a molecule; surface charge density; surface tension; symmetry number of molecule; wave number
τ (tau)	half-life; life of mercury drop; lifetime of molecule; time; true trasport number
φ (phi)	angle; dilution of solution; longitude; potential; potential difference (jump)
χ (chi)	transmission coefficient
ψ (psi)	apparent volume; potential
ω (omega)	angular velocity; fundamental frequency of vibrations; number of new molecules formed by one molecule of intermediate

The superscript ° (for example $G°$) on a thermodynamic function means that the substance is in its standard state.

The Greek letter Δ in front of a thermodynamic function (for example ΔG) means that the change (final minus initial) is referred to.