

1.3.3.2. List of frequently used symbols and abbreviations

1.3.3.2.1. Symbols

Symbol	Unit	Property
a, b, c	nm, pm	lattice parameters
B	T, G	magnetic field
B_c		critical value of magnetic field for metamagnetic transition
B_{eff}		effective magnetic field
B_{hf}		magnetic hyperfine field
B_{nf}		nucleation field for domain effects
B_0	Pa	bulk modulus ($B_0' = dB_0/dp$)
B_n^{m}	eV, K, cm^{-1}	crystal field parameters
c_{ij}	erg cm^{-3} , N m^{-2} , Pa	elastic stiffnesses
C	$\text{J mol}^{-1} \text{K}^{-1}$, $\text{cal mol}^{-1} \text{K}^{-1}$	heat capacity
C_L		lattice contribution to C
C_{magn}		magnetic heat capacity
C_p		heat capacity at constant pressure
C_{ph}		phonon part of heat capacity
C_{Sch}		Schottky heat capacity
C_V		heat capacity at constant volume
$C_{(\text{m})}$	$\text{emu K mol}^{-1} = \text{cm}^3 \text{K mol}^{-1}$	Curie constant per mole
e	C	electron charge
e^2qQ	mm s^{-1}	quadrupole coupling constant
E	V cm^{-1}	electric field strength
E	eV, Ry	energy
E_A		activation energy (for conductivity, mobility,...)
E_b		binding energy
E_F		Fermi energy
E_g		energy gap
E_0		incident (neutron) energy
f		magnetic form factor
g		spectroscopic splitting factor
G		de Gennes function
H	Oe, A m^{-1}	magnetic field (strength), mostly given as $\mu_0 H$ in tesla (T)
H_c		coercive force, critical field
H_{eff}		effective magnetic field
H_{hf}		magnetic hyperfine field
i	A cm^{-2}	current density
I	various units	intensity
I	A	electric current
J	eV	exchange interaction energy (J/k_B in K)
$J_{1,2}, J_{\text{AF}}, J_{\text{D}}, J_1', \dots$		exchange interaction energies (for special meaning see corresponding tables or figures)

Symbol	Unit	Property
J		total orbital angular momentum quantum number
k	nm^{-1}	wavevector
k_B	J K^{-1}	Boltzmann constant
K		Knight shift
$K_{1,2}$	$\text{J m}^{-3}, \text{J kg}^{-1}, \text{erg cm}^{-3}, \text{erg g}^{-1}$	anisotropy constant
M	$\text{G}, \text{A m}^{-1}$	magnetization
n	$\text{m}^{-3}, \text{cm}^{-3}, \text{atom}^{-1}$	carrier concentration
	n_e, n_h	number of electrons, holes
N		demagnetization factor
p	Pa, bar	hydrostatic pressure
p	μ_B	magnetic moment
	p_{eff}	effective (paramagnetic) moment
	p_{FU}	magnetic moment per formula unit
	p_L	orbital magnetic moment
	$p_M,$ $p(M)$	magnetic moment per ion M
	p_0	ordered magnetic moment
	p_s	saturation, spontaneous magnetic moment
	p_S	spin magnetic moment
	$p_{x,y,z}$	magnetic moment in x, y, z direction
P		probability
R	Ω	resistance
R		reflectivity
R	$\text{J K}^{-1}\text{mol}^{-1}, \text{cal K}^{-1}\text{mol}^{-1}$	gas constant
R_0	$\text{cm}^3 \text{C}^{-1}$	ordinary or normal Hall coefficient
R_H	$\text{m}^3 \text{C}^{-1}, \text{cm}^3 \text{C}^{-1}$	Hall coefficient
R_s	$\text{cm}^3 \text{C}^{-1}$	extraordinary Hall coefficient, spontaneous Hall coefficient
S		spin quantum number
S	$\text{mV K}^{-1}, \mu\text{V K}^{-1}$	Seebeck coefficient (thermoelectric power)
S	$\text{J K}^{-1} \text{mol}^{-1}, \text{cal K}^{-1} \text{mol}^{-1}$	entropy
	S_{magn}	magnetic contribution to entropy
$S(Q, \omega), S(\varphi, \omega)$	$\text{barn eV}^{-1} \text{sr}^{-1} \text{atom}^{-1}$	INS response function
T	$\text{K}, ^\circ\text{C}$	temperature
	T_c	(magnetic) transition temperature
	T_C	Curie temperature
	T_K	Kondo temperature
	T_N	Néel temperature
	T_S	superconducting critical temperature
	$T_{0,1,2,3},$ $T_v, T^*, ..$	crystallographic, magnetic or electric transition temperatures (see tables or figures for special meaning)
U	V	voltage
	U_H	Hall voltage
	U_i	induced voltage

Symbol	Unit	Property
v	$\text{cm s}^{-1}, \text{mm s}^{-1}$	velocity (mostly of absorber in Mössbauer effect)
V	nm^3	(unit cell) volume
V_0		volume under ambient conditions
W	mm s^{-1}	linewidth
x, y, z		fractional coordinates of atoms in the unit cell
α, β, γ	deg	unit cell angles
α	K^{-1}	linear thermal expansion coefficient
β		critical exponent of spontaneous magnetization
γ	$\text{J mol}^{-1} \text{K}^{-2}$	coefficient of electronic heat capacity
$\Delta, \Delta_{\text{CEF}}$	eV	CEF splitting energy (mostly given as Δ/k_{B} in K)
$\varepsilon = \varepsilon_1 - i \varepsilon_2$		dielectric constant
$\varepsilon_1, \varepsilon_2$		real, imaginary part of dielectric constant
$\text{Im } \varepsilon^{-1}$		energy loss function
ε_{K}	deg	Kerr ellipticity
θ	deg, rad	angle (scattering angle, field angle...), Faraday rotation angle
θ_{K}	deg	polar Kerr rotation (angle)
$\Theta, \Theta_{\text{p}}$	K	paramagnetic Curie temperature
Θ_{D}	K	Debye temperature
κ	$\text{W cm}^{-1} \text{K}^{-1}, \text{cal cm}^{-1} \text{K}^{-1}$	thermal conductivity
κ_{e}		electron contribution to thermal conductivity
κ_{m}		magnetic contribution to thermal conductivity
κ_{ph}		phonon contribution to thermal conductivity
λ	nm	wavelength
λ	$\text{mol cm}^{-3}, \text{mol m}^{-3}$	molecular field constant
μ	$\text{m}^2 \text{V}^{-1} \text{s}^{-1}, \text{cm}^2 \text{V}^{-1} \text{s}^{-1}$	mobility of charge carriers
$\mu_{\text{e}}, \mu_{\text{h}}$		electron, hole mobility
μ_{B}	J T^{-1}	Bohr magneton
ν	Hz	frequency
$\bar{\nu}$	cm^{-1}	wavenumber
$h\nu$	eV	photon energy
ρ	$\Omega \text{ cm}$	resistivity
ρ_{H}		Hall resistivity
ρ_{K}		Kondo resistivity
ρ_{m}		magnetic contribution to resistivity
ρ_{ph}		phonon part of resistivity
ρ_0		residual resistivity
$\Delta\rho/\rho_0$		magnetoresistance
σ	$\Omega^{-1} \text{cm}^{-1}$	electrical conductivity
$\sigma_{\text{ij}}, \sigma_{\text{opt}}$	s^{-1}	optical conductivity
$\sigma_{\text{xx}}, \sigma_{\text{xyt}}$		diagonal, off-diagonal optical conductivity

Symbol	Unit	Property
σ	$\text{emu g}^{-1} = \text{G cm}^3 \text{ g}^{-1}$, $\text{A m}^2 \text{ kg}^{-1}$	magnetic moment per unit mass = specific magnetization
σ_s		spontaneous specific magnetization
φ, ϕ	deg	angle, scattering angle
χ	emu	magnetic susceptibility
χ_g	$\text{emu g}^{-1} = \text{cm}^3 \text{ g}^{-1}$, $\text{m}^3 \text{ kg}^{-1}$	magnetic mass susceptibility
χ_m	$\text{emu mol}^{-1} = \text{cm}^3 \text{ mol}^{-1}$, $\text{m}^3 \text{ mol}^{-1}$	magnetic susceptibility per mole
χ_0		temperature independent magnetic susceptibility
χ_{ac}		ac magnetic susceptibility
χ', χ''		real, imaginary part of ac magnetic susceptibility
ω	s^{-1}	angular frequency
$\hbar\omega$	eV	photon energy

1.3.3.2.2 Abbreviations

ac	alternating current
av	average
An	actinide element
AF	antiferromagnetically ordered magnetic moment system
AOM	angular overlap model
APW	augmented plane wave (method)
ARPES	angle resolved photoelectron spectroscopy
c, cr	mostly as subscript: critical
CEF, CF	crystal electric field
CIP	crystallographic image processing
COOP	crystal orbital overlap population
CW, C-W	Curie Weiss (law)
DOS	density of states
eff	effective
exp	experimental
ECM	extended charge model
EDAX	energy dispersive X-ray analysis
F, FM	ferromagnetism, ferromagnetic
FC	field cooled
Fi	ferrimagnetic
FU, f.u.	formula unit
FWHM	full width at half maximum
GEM	generalized electrostatic model
GPM	generalized perturbation model
HRTM	high resolution transmission electron microscopy
IC(A)	intermediate coupling (approximation)

INS	inelastic neutron scattering
IR	infrared
IS	isomer shift
LMTO	linearized muffin-tin orbital
Ln	lanthanide
LS	lattice sum (model)
LSDA	local spin density approximation
magn	mostly as subscript: magnetic
max	maximum
M	metal (mostly non-transition metal)
MCW	modified Curie-Weiss law
MF(A)	molecular field (approximation)
NMR	nuclear magnetic resonance
(N)NN	(next) nearest neighbour
OVP	overlap model
poly	polycrystalline
P	paramagnetism, paramagnetic
PCM	point charge model
REN	renormalization model
RKKY	Ruderman-Kittel-Kasuya-Yosida
RM	refined model
RRR	relative residual resistivity
RS	Russell-Saunders (coupling)
RT	room temperature
s.c., sc	single crystal
SAED	selected area electron diffraction
T	transition metal
TEM	transmission electron microscopy
TIP	temperature independent paramagnetism
TLS	two-level system
UPS	UV photoemission spectroscopy
UV	ultraviolet
Vis	visible
X	pnictogens P, As, Sb, Bi
XPS	X-ray photoelectron spectroscopy
Y	chalcogens S, SAe, Te
Z	halogen Cl, Br, I
ZFC	zero field cooled
\perp, \parallel	perpendicular, parallel to a crystallographic axis