1.3.2.2. List of frequently used symbols and abbreviations

1.3.2.2.1. Symbols

Symbol		Unit	Property
a			activity
a, b, c		nm, pm	lattice parameters
B		T, G	magnetic field
	B_c		critical value of magnetic field for magnetic transition
	B_{hf}		magnetic hyperfine field
B_0		Pa	bulk modulus ($B_0' = dB_0/dp$)
B_n^m		cm^{-1}	crystal field parameters
c_{ij}		erg cm^{-3}	elastic stiffnesses
C		J mol^{-1} K^{-1}, cal $mol^{-1}K^{-1}$	heat capacity
	C_{el}		electronic contribution to C
	C_L		lattice contribution to C
	C_{magn}		magnetic heat capacity
	C_p		heat capacity at constant pressure
	C_V		heat capacity at constant volume
D_{UU}		Å	distance between U atoms
e		C	electron charge
e^2qQ		mm s^{-1}	quadrupole coupling constant
E		V cm^{-1}	electric field strength
E		eV, Ry, cm^{-1}	energy
	E_a		activation energy
	E_b		binding energy
	E_F		Fermi energy
	ΔE_g, E_g		energy gap
	E_{kin}		kinetic energy
f			magnetic form factor
g			spectroscopic splitting factor
H			Hamiltonian
H		Oe, A m^{-1}	magnetic field (strength), sometimes given as $\mu_0 H$ in tesla (T)
	H_c		coercive force, critical field
	H_{eff}		effective magnetic field
i		A cm^{-2}	current density
I		various units	intensity
	I_{magn}		magnetic integrated neutron diffraction intensity
J		eV	exchange interaction energy (J/k_B in K)
J			total orbital angular momentum quantum number
k		nm^{-1}	wavevector
k_B		J K^{-1}	Boltzmann constant
K		cm^{-1}	absorption coefficient
K			Knight shift
$K_{1,2}$		J m^{-3}, erg cm^{-3}, erg g^{-1}	anisotropy constants
$\Delta l_{(s)}$		cm	linear thermal expansion (of a standard)
L		erg g^{-1}, J kg^{-1}	torque
m^*		m_0	electron effective mass

Symbol	Unit	Property
m_c*	m_0	effective cyclotron mass
m_0	g	electron mass
M	G, A m^{-1}	magnetization
n	cm^{-3}, atom^{-1}	carrier concentration
n_H		Hall carrier concentration
p	Pa, bar, Torr	hydrostatic pressure
p_{N_2}		nitrogen equilibrium pressure
p	μ_B	magnetic moment
p_{eff}		effective (paramagnetic) moment
p_M		magnetic moment per ion M
p_0		ordered magnetic moment
p_s		saturation, spontaneous magnetic moment
r	pm	(ionic) radius
R	Ω	resistance
$\Delta R/R$		magnetoresistance
R		reflectivity
R	J K^{-1}mol^{-1}, cal K^{-1}mol^{-1}	gas constant
R_0	cm^3 C^{-1}, Ω cm G^{-1}	ordinary or normal Hall coefficient
R_s	cm^3 C^{-1}, V cm A^{-1} G^{-1}, Ω cm G^{-1}	anomalous Hall coefficient, spontaneous Hall coefficient
R*	V cm A^{-1} G^{-1}, cm^3 C^{-1}	effective Hall coefficient
S		spin quantum number
S	μV K^{-1}	Seebeck coefficient (thermoelectric power)
S	J K^{-1} mol^{-1}, cal K^{-1} mol^{-1}	entropy
S_{magn}		magnetic contribution to entropy
T	K, °C	temperature
T_C		Curie temperature
T_{max}		temperature at which a quantity (e.g. ρ) has its maximum
T_N		Néel temperature
T_t		magnetic transition temperature
T_1	s	spin lattice relaxation time
u, v, w		crystal structural parameters
U	V	voltage
v	cm s^{-1}, mm s^{-1}	velocity (mostly of absorber in Mössbauer effect)
V	nm^3	(unit cell) volume
V_0		volume under ambient conditions
w_i	μm	domain width
x, y, z		fractional coordinates of atoms in the unit cell
Z		atomic number
α, β, γ	deg	unit cell angles
α	deg	angle (e.g. between B and i)
α	K^{-1}	linear thermal expansion coefficient
β		critical exponent of spontaneous magnetization
γ, γ_s	J mol^{-1} K^{-2}	coefficient of electronic heat capacity
γ	Hz T^{-1}, Hz Oe^{-1}	nuclear gyromagnetic ratio
Γ	mm s^{-1}	linewidth, mostly the full (or half) width at half maximum, of the NGR spectra

Symbol	Unit	Property
δ	Ry	lifetime broadening parameter
$\varepsilon = \varepsilon_1 - i\,\varepsilon_2$		dielectric constant
ε_1, ε_2		real, imaginary part of dielectric constant
ε_K	deg	Kerr ellipticity
θ	deg, rad	angle (scattering angle, canting angle...)
θ_K	deg	polar Kerr rotation (angle)
Θ, Θ_p	K	paramagnetic Curie temperature
Θ_D	K	Debye temperature
κ	W cm^{-1} K^{-1}, cal cm^{-1} s^{-1} K^{-1}	thermal conductivity
λ	nm, Å	wavelength
λ		magnetostriction
λ_{hkl}		magnetostriction in hkl direction
λ_s		spontaneous magnetostriction
λ	mol cm^{-3}, mol m^{-3}	molecular field constant
μ	m^2 V^{-1} s^{-1}, cm^2 V^{-1} s^{-1}	mobility of charge carriers
μ_H		Hall carrier mobility
μ_B	J T^{-1}	Bohr magneton
ν	Hz	frequency
$\bar{\nu}$	cm^{-1}	wavenumber
$h\nu$	eV	photon energy
ρ	Ω cm, Ω m	resistivity
ρ_H		Hall resistivity
ρ_{magn}		magnetic contribution to resistivity
ρ_s		spin disorder resistivity
ρ_0		residual resistivity
$\Delta\rho/\rho(0)$		magnetoresistivity
σ	Ω^{-1} cm^{-1}	electrical conductivity
σ_{ij}	Ry/$\hbar$, s^{-1}	optical conductivity
σ_{xx}, σ_{xy}		diagonal, off-diagonal optical conductivity
σ	emu g^{-1} = G cm^3 g^{-1}, V s m^2 kg^{-1}, A m^2 kg^{-1}	magnetic moment per unit mass = specific magnetization
σ_s		spontaneous specific magnetization
σ_m	A m^2 mol^{-1}	magnetic moment per mol = molar magnetization
φ, ϕ	deg	angle (e.g. between B and crystal axis, angle of distortion, etc.)
χ	emu	magnetic susceptibility
χ_{av}		average magnetic susceptibility
χ_p		magnetic susceptibility of a powder (polycrystalline) sample
χ_g	emu g^{-1} = cm^3 g^{-1}, m^3 kg^{-1}	magnetic mass susceptibility
χ_m	emu mol^{-1} = cm^3 mol^{-1}, m^3 mol^{-1}	magnetic susceptibility per mole
χ_0		temperature independent or initial magnetic susceptibility
χ^*		effective magnetic susceptibility
ω	s^{-1}	angular frequency
$\hbar\omega$	eV	photon energy

1.3.2.2.2 Abbreviations

ac	alternating current
av	average
AF	antiferromagnetically ordered magnetic moment system
An	actinide element
APW	augmented plane wave (method)
ARPES	angle resolved photoelectron scoectroscopy
ASA	atomic sphere approximation
ASW	augmented spherical wave (method)
bcc	body centered cubic
BIS	bremsstrahlung isochromat spectroscopy
BZ	Brillouin zone
c, cr	mostly as subscript: critical
cal	calculated
CEF, CF	crystal electric field
CIS	constant initial state (spectroscopy)
CFS	constant final state (spectroscopy)
CVT	chemical vapour transport (method)
CW, C-W	Curie Weiss (law)
dHvA	de Haas van Alphen oscillations (method)
DFT	density functional theory
DOS	density of states
DTA	differential thermal analysis
eff	effective
exp	experimental
ELF	electron localization function
EPR	electron paramagnetic resonance
fcc	face centered cubic
F	ferromagnetism, ferromagnetic
FC	field cooled
FFT	fast Fourier transform (spectrum)
FS	Fermi surface
FU, f.u.	formula unit
IS	isomer shift
LAPW	linearized augmented plane wave (method)
LDA	local density approximation
LDFT	local density functional theory
LMTO	linearized muffin-tin orbital
LSC	liquidus-solidus curve
LSDA	local spin density approximation
LSDF	local (approximation to) spin density functional theory
magn	mostly as subscript: magnetic
max	maximum
M	metal
MASW	modified ASW (method)
MCW	modified Curie-Weiss law
MF(A)	molecular field (approximation)
MR	magnetoresistance

NGR	nuclear gamma resonance (Mössbauer effect)
NMR	nuclear magnetic resonance
OPE	orbital polarization enhancement
poly	polycrystalline
P	paramagnetism, paramagnetic
PCM	point charge model
QCP	quantum critical point
R	rare earth element
RKKY	Ruderman-Kittel-Kasuya-Yosida
RRR	relative residual resistivity
RT	room temperature
s.c., sc	single crystal
s.g.	space group
SDFT	spin density functional theory
SdH	Shubnikov de Haas (method)
theor.	theoretical
TSIT	thermopower sign inversion temperature
TEP	thermoelectric power
UPS	UV photoemission spectroscopy
X	pnictogens P, As, Sb, Bi
XAS	X-ray absorption spectroscopy
XPS	X-ray photoelectron spectroscopy
Y	chalcogens S, SAe, Te
ZFC	zero field cooled
$\perp$, $\parallel$	perpendicular, parallel to a crystallographic axis