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Preface

The intrinsic magnetic properties of metals, alloys and metallic compounds have been systematically compiled in the various subvolumes 19A–F of the Landolt-Börnstein New Series Group III. Each subvolume is devoted to a separate and, from a point of view of the Periodic Table of the Elements, coherent group of substances. The amount of experimental data that became available since the publishing of each of these subvolumes in the years 1986 to 1994 gave us every reason to ask the various authors to consider the appropriateness of preparing supplements to their original work. As a result the first subvolume LB III/32A has been published in 1996, dealing with the magnetic properties of substances consisting of 3d, 4d and 5d elements, and of alloys between these elements, as well as alloys and compounds between 4d or 5d elements and main group elements.

The present subvolume LB III/32C is the second of two volumes dedicated to alloys and compounds of 3d elements and main group elements. The first volume, LB III/32B, has been published in 1999. LB III/32C is the supplement to volume LB III/19C covering the literature up to 1996. The alloys considered comprise Heusler alloys as well as alloys consisting of 3d elements and C, Si, Ge, Sn or Pb.

Many thanks are due to the authors for the continued agreeable cooperation and their patience with the delay in the publication of this volume, Frau G. Burfeindt and Dr. W. Finger of Landolt-Börnstein's editorial office for the great help in the editorial work, especially in preparing the electronic files that were used in printing, and, last but not least, Springer-Verlag for the carefulness with respect to the publication of this volume.

Aachen, January 2001 **The Editor**

Contents of Subvolume III/32 C

List of symbols

Symbol	Unit	Quantity
a, b, c	nm, Å	lattice parameters
a_{us}	db cm^{-1}	ultrasonic attenuation
B	Pa	bulk modulus
B	T, G	magnetic induction
B_{cr}	T, G	metamagnetic transition field
B_r	T, G	residual induction
$(BH)_{max}$	J m^{-3}, G Oe	maximum energy product
C_p	J kg^{-1} K^{-1}	heat capacity at constant pressure
C_V	J kg^{-1} K^{-1}	heat capacity at constant volume
c	m s^{-1}	sound velocity
c_{ij}	Pa	elastic constants
D	eV $Å^2$, THz $Å^2$	q^2-expansion coefficient of the spinwave energy
E	J, erg, eV, Ry	energy
E	Pa	Young's modulus
E_a	J m^{-3}, Pa	anisotropy energy
ΔE_a	J m^{-3}, Pa	magnetoelastic anomaly
E_b	eV	binding energy
E_F	eV	Fermi energy
e/a		electrons per atom
e^2qQ	mm s^{-1}	nuclear quadrupole coupling constant
eQV_{zz}	mm s^{-1}	nuclear quadrupole coupling constant
f		magnetic form factor
f	T	de Haas – van Alphen frequency
G	Hz	Gilbert damping parameter
G	Pa	shear modulus
g		g-factor
H	J	enthalpy
H	A m^{-1}, Oe	magnetic field
H_A	A m^{-1}, Oe	magnetic anisotropy field
H_c	A m^{-1}, Oe	coercive field
H_{ext}	A m^{-1}, Oe	external magnetic field
H_{hf}, H_{hyp}	A m^{-1}, Oe	magnetic hyperfine field
h	J s	Planck's constant
$\hbar$	J s	Planck's constant divided by 2π
h, k, l		Miller indices
I		intensity
I	A	electrical current
J		total angular momentum
J	eV	exchange constant
K		Knight shift
K	$Å^{-1}$	wavevector

Symbol	Unit	Quantity
K	J m^{-3}, erg cm^{-3}, Pa	anisotropy constant
K_n	J m^{-3}, erg cm^{-3}, Pa	nth-order magnetocrystalline anisotropy constants
k_B	J K^{-1}	Boltzmann constant
L		orbital angular momentum
$\Delta l/l$		linear magnetostriction
M	A m^{-1}, T, G	magnetization
M_r	A m^{-1}, T, G	remanence
M_s	A m^{-1}, T, G	saturation magnetization
m_z	A m^{-1}, T, G	magnetization component
$N(E_F)$, N_F	states eV^{-1} at^{-1}	density of states at the Fermi energy
n	states eV^{-1} at^{-1}	density of states
P		neutron polarization
$P(H)$		probability distribution
p	Pa, bar	pressure
p	μ_B	atomic magnetic moment
$\overline{p}$	μ_B	average atomic magnetic moment
p_{at}	μ_B	magnetic moment per atom
p_{eff}	μ_B	effective paramagnetic moment
Q	J g^{-1}	heat of transformation
Q	mm s^{-1}	quadrupole shift
Q	V K^{-1}	thermoelectric power
Q, q	Å^{-1}	wavevector
q_c/q_s		Rhodes – Wohlfarth ratio
R	J mol^{-1} K^{-1}	gas constant
R	Ω	electrical resistance
R	m^3 C^{-1}	Hall coefficient
R_0	m^3 C^{-1}	ordinary Hall coefficient
R_s	m^3 C^{-1}	extraordinary Hall coefficient
S		spin angular momentum
S	J K^{-1}	entropy
S	V K^{-1}	thermoelectric power
$S(K)$	barn sr^{-1} at^{-1}	elastic differential scattering function
T	K, °C	temperature
T_a	K	annealing temperature
T_C	K	Curie temperature
T_{cr}	K	critical temperature
T_f	K	spin-freezing temperature
T_g	K	spin-glass transition temperature
T_N	K	Néel temperature
T_R	K	spin reorientation temperature
T_t	K	transition temperature
T_1	s	longitudinal nuclear spin relaxation time
t	s	time
V	V	voltage
V_{zz}	V cm^{-2}	zz-component of electric field gradient
V	m^3	volume
v	m s^{-1}	velocity
x, y		composition
α	V K^{-1}	thermoelectric power
α	K^{-1}	linear thermal expansion coefficient

Symbol	Unit	Quantity
α_V	K^{-1}	volume thermal expansion coefficient
Γ	erg g^{-1}	torque
Γ	meV	linewidth, damping constant
γ	Hz G^{-1}	gyromagnetic ratio
γ	J mol^{-1} K^{-2}	electronic specific heat coefficient
Δ	mm s^{-1}	quadrupole splitting
δ	mm s^{-1}	isomer shift
δ		incommensurability factor, $\delta = 1 - Qa/2\pi$
ε		linear strain
ς		reduced wavevector
Θ	K	paramagnetic Curie temperature
Θ_D	K	Debye temperature
θ	deg	angle
κ	$Å^{-1}$	inverse correlation length
κ	W m^{-1} K^{-1}	thermal conductivity
λ		magnetostriction
λ	Å	wavelength
λ	s^{-1}	relaxation rate
μ		relative permeability
μ_i		initial permeability
μ_0	T m A^{-1}	permeability of the vacuum
ν	s^{-1}, Hz	frequency
ν_Q	mm s^{-1}	quadrupole splitting
ρ	g cm^{-3}	density
ρ	cm^{-2}	dislocation density
ρ	Ω m	electrical resistivity
ρ_H	Ω m	Hall resistivity
$\Delta\rho/\rho$		magnetoresistance
σ	A m^2 kg^{-1}, V s m kg^{-1}, G cm^3 g^{-1}	bulk magnetic moment per unit of mass
σ	A m^2 mol^{-1}, V s m mol^{-1}, G cm^3 mol^{-1}	bulk magnetic moment per mole
σ	Pa	stress
σ	barn	cross section
τ	s	relaxation time
τ	s^{-1}	relaxation rate
ϕ	deg	angle
χ_g	m^3 kg^{-1}, cm^3 g^{-1}	magnetic susceptibility per unit of mass
χ_V		magnetic susceptibility per unit of volume
χ_m	m^3 mol^{-1}, cm^3 mol^{-1}	magnetic susceptibility per mole
χ_P		Pauli susceptibility
χ'		real part of the complex magnetic susceptibility
χ''		imaginary part of the complex magnetic susceptibility
χ_1, χ_2		nonlinear magnetic susceptibility
Ω	sr	solid angle
ω		volume magnetostriction
ω	rad s^{-1}	angular precession frequency
$\hbar\omega$	eV	excitation energy

List of abbreviations

a.u.	atomic unit
ac	alternating current
AF	antiferromagnetic
ASRO	atomic short range order
at	atom
av	average
bcc	body-centered cubic
bct	body-centered tetragonal
BPP	Bloembergen – Purcell – Pound
CG	cluster glass
cl	cooling
cr	critical
ct	centroid
cub	cubic
dc	direct current
dHvA	de Haas – van Alphen
dis	disordered
DOS	density of states
eff	effective
el	electronic
ESR	electron spin resonance
ext	external
F	ferromagnetic
FC	field-cooled
fcc	face-centered cubic
fct	face-centered tetragonal
FWHM	full width at half maximum
hcp	hexagonal close-packed
HF	high field
hf	hyperfine field
inf	inflection
int	internal
IRM	isothermal remanent magnetization
mag	magnetic
max	maximum
mc	multicritical
ME	Mössbauer effect
min	minimum
μSR	muon spin resonance
NF	nonordered ferromagnetic
nl	nonlinear
NMR	nuclear magnetic resonance
orth	orthorhombic
P	paramagnetic
PAC	perturbed angular correlation
ppm	parts per million
res	resonance
rf	radio frequency
RT	room temperature
s	spontaneous; saturation
sc	single crystal
SCR	self-consistent renormalization
SDW	spin-density wave
S-K	Sherrington – Kirpatrick
tetr	tetragonal
trans	transmitted
TRM	thermoremanent magnetization
UPS	ultraviolet photoelectron spectroscopy
us	ultrasonic
wt	weight
XPS	X-ray photoelectron spectroscopy
ZFC	zero-field cooled