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OF
Chemistry and Physics

A Ready-Reference Book of Chemical and Physical Data

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Permanent Magnet Alloys

Material	Percent composition (remainder Fe)	Heat treatment* (temperature, °C)	Magnetizing force $H_{max.}$ oersteds	Coercive force H_c oersteds	Residual induction B_r gausses	Energy product $BH_{max.} \times 10^{-6}$	Method of fabrication†	Mechanical properties‡	Weight lb/in.³
[illegible]	1 Mn, 0.9 C	Q 800	300	50	10,000	.20	HR, M, P	H, S	.280
[illegible] steel	5 W, 0.3 Mn, 0.7 C	Q 850	300	70	10,300	.32	HR, M, P	H, S	.292
[illegible] steel	3.5 Cr, 0.9 C, 0.3 Mn	Q 830	300	65	9,700	.30	HR, M, P	H, S	.280
[illegible] steel	17 Co, 0.75 C, 2.5 Cr, 8 W	—	1,000	150	9,500	.65	HR, M, P	H, S	—
[illegible] steel	36 Co, 0.7 C, 4 Cr, 5 W	Q 950	1,000	240	9,500	.97	HR, M, P	H, S	.296
[illegible] Comol	17 Mo, 12 Co	Q 1200, B 700	1,000	250	10,500	1.1	HR, M, P	H	.295
[illegible]	12 Al, 20 Ni, 5 Co	A 1200, B 700	2,000	440	7,200	1.4	C, G	H, B	.249
[illegible]	10 Al, 17 Ni, 2.5 Co, 6 Cu	A 1200, B 600	2,000	550	7,200	1.6	C, G	H, B	.256
[illegible] (sintered)	10 Al, 17 Ni, 2.5 Co, 6 Cu	A 1300	2,000	520	6,900	1.4	Sn, G	H	.249
[illegible]	12 Al, 28 Ni, 5 Co	Q 1200, B 650	3,000	700	5,500	1.3	Sn, C, G	H	.253
[illegible]	8 Al, 14 Ni, 24 Co, 3 Cu	AF 1300, B 600	2,000	550	12,500	4.5	C, G	H, B	.264
[illegible]	8 Al, 15 Ni, 24 Co, 3 Cu, 1 Ti	—	3,000	750	10,000	3.5	C, G	H, B	.268
[illegible]	6 Al, 18 Ni, 35 Co, 8 Ti	—	3,000	950	5,800	1.5	C, G	H, B	.26
[illegible]	52 Co, 10 V	B 600	1,000	300	8,800	1.0	C, CR, M, P	D	.295
[illegible] (wire)	52 Co, 14 V	CW + B 600	2,000	510	10,000	3.5	C, CR, M, P	D	.292
[illegible]	60 Cu, 20 Ni	CW + B 600	2,400	550	5,400	1.5	C, CR, M, P	D, M	.311
[illegible]	50 Cu, 21 Ni, 29 Co	—	3,200	660	3,400	.80	C, CR, M, P	D, M	.300
[illegible]	30 Fe_2O_3, 44 Fe_3O_4, 26 C_2O_3	—	3,000	1,000	1,600	.60	Sn, G	W	.113
[illegible]	86.8 Ag, 8.8 Mn, 4.4 Al	—	20,000	6,000[a]	550	.075	C, CR, M, P	D, M	.325
[illegible] cobalt	77 Pt, 23 Co	Q 1200, B 650	15,000	3,600	5,900	6.5	C, CR, M	D	—
[illegible]	Fine powder	—	2,000	390	6,600	.97	—	—	.176

[illegible] given is intrinsic H_c.
[illegible] Quenched in oil or water. A—Air cooled. B—Baked. F—Cooled in magnetic field. CW—Cold worked.
[illegible] Hot rolled or forged. CR—Cold rolled or drawn. M—Machined. G—Must be ground. P—Punched. C—Cast. Sn—Sintered.
[illegible] Hard. B—Brittle. S—Strong. D—Ductile. M—Malleable. W—Weak.

MAGNETIC SUSCEPTIBILITY OF THE ELEMENTS AND INORGANIC COMPOUNDS

The following table lists the magnetic susceptibilities of one gram formula weight of a number of paramagnetic and diamagnetic inorganic compounds as well as the magnetic susceptibilities of the elements.

In each instance the magnetic moment is expressed in cgs units.

A more extensive listing of the magnetic susceptibilities of inorganic compounds as well as those for organic compounds may be found in Constantes Selectionnees Diamagnetisme et Paramagnetisme Relaxation Paramagnetique, Volume 7. This table is abridged from the above publication by permission of the publishers.

Substance	Formula	Temp. °K.	Susceptibility 10^{-6} cgs
[illegible]	Al	ord.	+16.5
[illegible]	Al	.....	+12.0
[illegible]	AlF_3	302	−13.4
[illegible]	Al_2O_3	ord.	−37.0
[illegible]	$Al_2(SO_4)_3$	ord.	−93.0
[illegible]	$Al_2(SO_4)_3 \cdot 18H_2O$	ord.	−323.0
[illegible]	NH_3	ord.	−18.0
[illegible] (aq)	NH_3	ord.	−17.0
[illegible]	$NH_4C_2H_3O_2$	ord.	−41.1
[illegible]	NH_4Br	ord.	−47.0
[illegible]	$(NH_4)_2CO_3$	ord.	−42.50
[illegible]	NH_4ClO_3	ord.	−42.1
[illegible]	NH_4Cl	ord.	−36.7
[illegible]	NH_4F	ord.	−23.0
[illegible] (aq)	NH_4OH	ord.	−31.5
[illegible]	NH_4IO_3	ord.	−62.3
[illegible]	NH_4I	ord.	−66.0
[illegible]	NH_4NO_3	ord.	−33.6
[illegible]	$(NH_4)_2SO_4$	ord.	−67.0
[illegible]	NH_4SCN	ord.	−48.1
[illegible]	Am	300	+1000.0
[illegible]	Sb	293	−99.0
[illegible]	Sb	.....	−2.5
[illegible]	$SbBr_3$	ord.	−115.0
[illegible]	$SbCl_3$	ord.	−86.7
[illegible] pentata	$SbCl_5$	ord.	−120.0
[illegible]	SbF_3	ord.	−46.0
[illegible]	SbI_3	ord.	−147.0
[illegible]	Sb_2O_3	ord.	−69.4
[illegible]	Sb_2S_3	ord.	−86.0
[illegible]	A	ord.	−19.6
[illegible]	As	293	−5.5
[illegible]	As	293	−23.7
[illegible]	As	293	−23.0
[illegible]	$AsBr_3$	ord.	−106.0
[illegible]	$AsCl_3$	ord.	−79.9
[illegible]	AsI_3	ord.	−142.0
[illegible]	As_2S_3	ord.	−70.0
[illegible] Acid	H_3AsO_3	ord.	−51.2
[illegible]	Ba	ord.	+20.6
[illegible]	$Ba(C_2H_3O_2)_2 \cdot H_2O$	ord.	−100.1
[illegible]	$Ba(BrO_3)_2$	ord.	−105.8
Barium (continued)			
Bromide	$BaBr_2$	ord.	−92.0
"	$BaBr_2 \cdot 2H_2O$	ord.	−119.0
Carbonate	$Ba(CO_3)$	ord.	−58.9
Chlorate	$Ba(ClO_3)_2$	ord.	−87.5
Chloride	$BaCl_2$	ord.	−72.6
"	$BaCl_2 \cdot 2H_2O$	ord.	−100.0
Fluoride	BaF_2	ord.	−51.0
Hydroxide	$Ba(OH)_2$	ord.	−53.2
"	$Ba(OH)_2 \cdot 8H_2O$	ord.	−157.0
Iodate	$Ba(IO_3)_2$	ord.	−122.5
Iodide	BaI_2	ord.	−124.0
"	$BaI_2 \cdot 2H_2O$	ord.	−163.0
Nitrate	$Ba(NO_3)_2$	ord.	−66.5
Oxide	BaO	ord.	−29.1
"	BaO_2	ord.	−40.6
Sulfate	$BaSO_4$	ord.	−71.3
Beryllium (s)	Be	ord.	−9.0
Chloride	$BeCl_2$	ord.	−26.5
Hydroxide	$Be(OH)_2$	ord.	−23.1
Nitrate (aq)	$Be(NO_3)_2$	298	−41.0
Oxide	BeO	ord.	−11.9
Sulfate	$BeSO_4$	ord.	−37.0
Bismuth (s)	Bi	ord.	−280.1
" (l)	Bi	.....	−10.5
Bromide	$BiBr_3$	ord.	−147.0
Chloride	$BiCl_3$	ord.	−26.5
Chromate	$Bi_2(CrO_4)_3$	ord.	+154.0
Fluoride	BiF_3	303	−61.0
Hydroxide	$Bi(OH)_3$	ord.	−65.8
Iodide	BiI_3	ord.	−200.5
Nitrate	$Bi(NO_3)_3$	ord.	−91.0
"	$Bi(NO_3)_3 \cdot 5H_2O$	ord.	−159.0
Oxide	BiO	ord.	−110.0
"	Bi_2O_3	ord.	−83.0
Phosphate	$BiPO_4$	ord.	−77.0
Sulfate	$Bi_2(SO_4)_3$	ord.	−199.0
Sulfide	Bi_2S_3	ord.	−123.0
Boric Acid	H_3BO_3	ord.	−34.1
Boron (s)	B	ord.	−6.7
Chloride	BCl_3	ord.	−59.9
Oxide	B_2O_3	ord.	−39.0
Bromine (l)	Br_2	.....	−56.4
" (g)	Br_2	.....	−73.5

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