68-97

Table 3.--The chemical compositions of the meteorites

FAMILY	VOLATILE-RICH	VOLATILE-POOR																								FAMILY
	CALCIUM-POOR METEORITES																		CALCIUM-RICH METEORITES					CALCIUM-RICH--CALCIUM-POOR MIXTURE		
Class	Carbonaceous meteorite		Olivine-pigeonite			Olivine-hypersthene					Olivine-bronzite[1]					Enstatite			Diopside-olivine	Augite	Pyroxene-plagioclase			Mesosiderite		Class
Texture or phase	Chondrite	Achondrite	Chondrite	Achondrite		Chondrite[2]	Achondrite	Stony-iron	Nickel-iron		Chondrite[2]	Stony-iron		Nickel-iron		Chondrite[3]	Achondrite[3]	Nickel-iron			Hypersthene-anorthite	Pigeonite-anorthite				Texture or phase
Type, structure or common name	Type II[4]	Type I[4]	Type III[4]	Chassignite[5]	Ureilite[3]		Diogenite[6]	Siderphyre[7]	Hexahedrite[8]	Ni-poor ataxite[8]		Pallasite[9]	Lodranite[10]	Fine octahedrite[11]	Ni-rich ataxite[12]		Aubrite[3]	Coarse octahedrite[13]	Nakhlite[14]	Angrite[15]	Howardite[6]	Eucrite[6]	Shergottite[3]	(Entire meteorite)[16]	(Stony fraction)[17]	Type, structure or common name
Number of meteorites averaged	8	3	5	1	2	68	4	1	34	14	36	10,14	1	10	24	8	4	34	1	1	8	13	1	4,9	4	Number of meteorites averaged
Silicates:																										Silicates
SiO_2	27.31	23.08	33.75	36.80	38.90	39.87	52.11	34.61			36.33	17.05	28.94			38.62	54.01		48.96	44.58	49.27	47.60	49.92	19.51	46.03	SiO_2
MgO	19.00	15.56	23.86	31.94	35.73	25.16	25.85	10.08			23.53	19.83	23.33			21.01	35.92		12.01	10.05	11.76	8.46	9.95	6.36	15.00	MgO
FeO	20.06	10.32	24.32	27.09	12.73	14.66	16.05	4.40			9.61	6.65	7.71			1.69	0.97		19.63	8.50	15.58	15.58	18.92	5.73	13.52	FeO
Fe_2O_3	--	--	--	--	--	--	--	--			--	--	--			--	--		1.29	1.81	1.56	0.98	3.15	1.95	4.60	Fe_2O_3
Al_2O_3	2.31	1.77	2.65	1.17	0.38	2.51	1.18	--			2.66	0.38	0.19			1.87	0.67		1.74	8.86	9.95	13.01	5.87	4.10	9.67	Al_2O_3
CaO	2.03	1.51	2.32	0.60	0.79	1.89	1.41	--			1.76	0.28	0.18			0.97	0.91		15.17	24.51	7.71	10.18	10.35	2.89	6.82	CaO
Na_2O	0.54	0.76	0.55	0.27	0.43	0.95	0.004	--			0.86	0.07	--			1.00	1.32		0.41	0.26	1.06	0.43	(1.27)	(0.17)	(0.40)	Na_2O
K_2O	0.05	0.07	0.05	0.16	--	0.15	0.001	--			0.12	0.01	--			0.11	0.10		0.14	0.19	0.36	0.06	0.18	--	--	K_2O
Cr_2O_3	0.39	0.28	0.51	0.78	0.43	0.45	0.80	--			0.42	0.68	0.17			0.35[18]	0.06		0.33	Trace	0.53	0.36	--	0.36	0.85	Cr_2O_3
MnO	0.17	0.19	0.20	0.24	0.35	0.29	0.32	--			0.25	0.08	--			0.14	0.14		0.09	--	0.66	0.47	--	0.22	0.52	MnO
TiO_2	0.10	0.08	0.12	--	0.09	0.15	0.19	--			0.15	0.0[illegible]	--			0.06	0.06		0.38	2.39	0.10	0.43	--	--	--	TiO_2
P_2O_5	0.27	0.27	0.32	0.12	0.07	0.27	0.01	--			0.26	--	--			0.20	0.22			0.13	0.08	0.09	--	--	--	P_2O_5
H_2O	13.23	20.54	1.00	0.24	1.13	--	0.14	--			--	--	--			0.62	1.14		0.07	--	0.33	0.61	--	0.69	--	H_2O
NiO	1.56	1.17	0.33	--	--	--	--	--			--	0.29	--			0.00	0.26			--	--	--	--	0.40	--	NiO
Total	87.02	75.60	89.98	99.41	91.03	86.35	98.06	49.09			75.95	45.34	60.52			66.29	95.78		100.22	98.74	98.95	98.27	100.00	42.38		Total
Metals																										Metals
Fe	0.00	0.11	2.34		8.13	6.28	0.79	46.02	92.76	91.88	16.79	48.98	27.77	88.94	79.63	19.82	2.29	87.67		--	0.35	1.18		45.95		Fe
Ni	0.16	0.02	1.08		0.15	1.10	0.03	4.74	5.56	6.95	1.63	4.66	4.05	8.85	18.90	1.66	0.17	7.11		--	0.10	--		4.39		Ni
Co	0.00	0.00	0.06		--	0.059	--	0.15	0.66	0.55	0.089	0.30	--	0.56	1.01	0.12	--	0.52		--	--	--		0.28		Co
P	--	--	--		--	--	--	--	0.29	0.18	--	0.11	--	0.17	0.12	--	--	0.17		--	--	--		0.11		P
Cu	--	--	--		--	--	--	--	0.35	0.19	--	--	--	0.05	0.05	--	--	0.17		--	--	--		--		Cu
Total	0.16	0.13	3.48		8.28	7.44	0.82	50.91	99.62	99.75	18.51	54.05	31.82	98.57	99.71	21.60	2.46	95.64			0.45	1.18		50.73		Total
FeS	8.58[19]	16.88[19]	6.08	0.60	--	6.07	1.12	--			5.27	0.53	7.40	0.65	--	10.70	1.25	3.64		1.26	0.60	0.56		2.83		FeS
C	2.44	3.62	0.46		0.69	--	--	--	0.19	0.08	--	0.08	--	0.60	0.10	0.29	--	0.20		--	--	--		--		C
Other	1.80[20]	3.77[20]	--		--	--	--	--	0.19	0.17	--	--	0.26[21]	0.18	0.19	0.77[22]	0.51[22]	0.52		--	--	--		4.06[21]		Other

1/. No bronzite achondrites are known. May be represented by bronzite achondrite fragment in polymict (?) bronzite chondrite Breitscheid, described by Wlotzka (1963).
2/. From Mason (1965).
3/. From compilation of Wood (1963a, table 10). Less reliable values, obtained by older techniques, appear in parentheses. K_2O value for Shergotty is from Geiss and Hess (1958).
4/. Classification of Wiik (1956).
5/. Jérémine and others (1962).
6/. Urey and Craig (1953).
7/. From compilation of Wood (1963a, table 10; analysis by N. S. Maskelyne, 1871).
8/. Falls solely in Ga-Ge group II (Lovering and others, 1957). Data from Wood (1963a, table 11a).
9/. Ga-Ge group III (Lovering and others, 1957). Data from Wood (1963a, table 10), who averaged the stony phase of 10 pallasites and the metal phase of 14 pallasites.
10/. Tschermak (1870).
11/. Fine octahedrite group of Wood (1963a, table 12); may approximate Ga-Ge group III of Lovering and others (1957).
12/. Nickel-rich ataxites fall dominantly in Ga-Ge group IV (Lovering and others, 1957). Data from Wood (1963a, table 11a).
13/. Coarse octahedrite of Wood (1963a, table 11a); may approximate Ga-Ge group I (Lovering and others, 1957).
14/. Prior (1912).
15/. Mason (1962a, p. 115).
16/. From Wood (1963a, table 10). Stony phase is average by Wood of Vaca Muerta, Hainholz, Pinnaroo and Mincy. Iron phase is average of nine mesosiderites by Buddhue (1966).
17/. Calculated on metal-free basis from data of Wood (1963a, table 10).
18/. Cr_2S_3.
19/. Wiik (1956) reports all sulfur as FeS. Carbonaceous meteorites, however, are not characterized by troilite. Rather the sulfur is present as soluble sulfates and elemental S (DuFresne and Anders, 1962), and as pentlandite (Fredriksson and Keil, 1964). Some of the iron reported here as FeS, thus, properly should be reported as FeO.
20/. Loss on ignition. Wiik (1956) considers this loss approximately equal to the content of complex organic matter.
21/. Insoluble.
22/. CaS.