

SUPPLEMENTARY TABLE S5. Modal abundances (vol %) and Sm concentration (µg/g) of apatite and merrillite in different achondrites, as well as the respective bulk concentration of the host and the proportions of Sm assembled the Ca-phosphate species.

sample	modal abundances in vol%			Sm concentration in µg/g			Portion ^(*) of Sm in		
	Ap	Mer	both species	Ap	Mer	bulk rock	Ap	Mer	both species
Acapulco	<i>min</i>			9.5	19.5	0.16 ^a	44%	23%	67%
	<i>max</i>			22.0	100.9	0.4 ^a	41%	48%	89%
	avg	0.74	0.19	16.6	42.7	0.21^a	58%	39%	97%
Dhofar 125	<i>min</i>	-		17.7	-		89%	-	89%
	<i>max</i>	-		23.2	-		117%	-	117%
	avg	1.1	1.1^b	19.1	-	0.22^b	96%	-	96%
HaH 193	<i>min</i>	0.1	0.1 ^c	3.6	-		2%	-	2%
	<i>max</i>	0.3	0.3 ^c	10.0	-		19%	-	19%
	avg	0.2	0.30	5.8	-	0.18^d	6%	-	6%
NWA5073	<i>min</i>	0.10	-	140	-		12%	0%	12%
	<i>max</i>	0.20	-	976	-		81%	0%	81%
	avg	0.15	0.2^e	417	-	2.4^e	35%	0%	35%
Millbillillie	<i>min</i>	0.08	0.02	49.0	2548		3%	38%	41%
	<i>max</i>	0.16	0.04	78.7	2645		9%	78%	88%
	avg	0.12	0.03	61.9	2597	1.35^f	6%	58%	63%
SaU 005	<i>min</i>	-		-	45.7	0.43 ^g	-	26%	26%
	<i>max</i>	-		-	51.3	0.45 ^h	-	27%	27%
	avg	-	0.24	-	48.8	0.44	-	27%	27%
DaG 1051	<i>min</i>	-	0.69	-	50.7	0.35 ⁱ	-	100%	100%
	<i>max</i>	-	1.00	-	70.9	0.39 ^k	-	182%	182%
	avg	-	0.85	-	61.7	0.37	-	141%	141%
Zagami	<i>min</i>	-	0.6	2.2	33.0	0.96 ^m	-	21%	21%
	<i>max</i>	-	1.2	7.7	90.8	1.11 ⁿ	-	98%	98%
	avg	-	0.9	4.8	68.4	1.20	-	51%	51%
NWA 4864	<i>min</i>	0.33	1.01	64.4	57.5		30%	82%	112%
	<i>max</i>	0.42	1.28	77.4	82.9		46%	152%	198%
	avg	0.37	1.15	68.5	72.5	0.71^p	36%	117%	153%
Dalgaranga	<i>min</i>	-	1	-	12.1	0.144 ^r	-	84%	84%
	<i>max</i>	-	3.4	-	19.1	0.152 ^r	-	427%	427%
	avg	-	0.9	-	15.1	0.15	-	92%	92%
Landes	<i>min</i>					0.18 ^s	5%	3%	7%
	<i>max</i>					0.4 ^s	2%	1%	3%
	avg	0.14	0.12	6.4	3.7	0.27^s	3%	2%	5%

(*) The mass balance is not corrected for the density of the respective phases, because the main coexisting minerals all have a narrow density range of 3.1-3.6 g/cm³, and the error in the determination of the modal abundances has a significantly higher effect on the resulting proportions.

(*) Modal abundances were obtained from SEM phosphorus mappings. Depending on the magnification and size of analyzed area, smaller phosphate grains (<5-10 µm) may have not been detected. Apatite and merrillite abundances have subsequently been calculated from the modal phosphorus abundance in proportion to the measured grain sizes of the documented grains. *Modal abundances resulting in overconsumption of the bulk REE budget have been marked in italic. This may be due to a heterogeneous distribution of phosphates within the bulk rock or due to errors in their identification (phosphates in general, as well as distinction of apatite and merrillite). In this case the actual modal abundance might be lower.*

References: a) Zipfel et al. 1995; b) Patzer et al. 2004; c) Floss et al. 2007; d) Hunt et al. 2017 e) Roszjar et al. 2011; f) Kitts & Lodders 1998; g) Dreibus et al. 2000; h) P. Warren, personal communication; i) Folco et al. 2000 (on DaG 476 paired with DaG 1051); j) Barrat et al. 2001 (on DaG 476 paired with DaG 1051); k) Zipfel et al. 2000 (on DaG 476 paired with DaG 1051); l) McCoy et al. 1992; m) Barrat et al. 2001; n) Lodders 1998; o) Wittke et al. 2006; p) Bendel 2013; q) Prinz et al. 1980; r) Hidaka & Yoneda 2011; s) Bild 1977 (nonmetallic portion).

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