

3

[illegible]

20	4.7	2.18	18%	0.713556	0.000019	2	-0.05	0.03	2
20	5.3	2.31	19%	0.713556	0.000019	2	-0.04	0.03	2
barite treated with reverse aqua regia									
20	5.3	2.18	18%	0.713536	0.000019	2	-0.06	0.03	2
20	5.5	2.52	21%	0.713565	0.000019	2	-0.07	0.03	2
barite treated with H ₂ O ₂									
20	3.5	1.64	13%	0.713546	0.000019	2	-0.07	0.03	2
20	2.3	0.93	8%	0.713547	0.000019	2	-0.07	0.03	2
Average				0.713555	0.000023	46	-0.06	0.02	28^d

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5 Note: ^a n is the number of repeated measurements of the same solution. When n>2, 2SD
6 = 2 times the standard deviation of the population of n repeated measurements;
7 otherwise, 2SD = two times the standard deviation of N (N >30) repeat measurements
8 of the in-house reference solutions during an analytical session. ^b C_[Sr] is the Sr content
9 (mg) replaced by Na₂CO₃ per gram of sample. ^c R_[Sr] the recovery rate to estimate the
10 fraction of dissolved Sr from barite using equation (2). ^d Average $\delta^{88}\text{Sr}$ values of
11 samples whose Na₂CO₃:BaSO₄≥10.

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13 Table S2 $\delta^{88}\text{Sr}$ of doping experiments and synthetic solution

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Sample	Ba/Sr	$^{87}\text{Sr}/^{86}\text{Sr}$	2SD ^a	$\delta^{88}\text{Sr}$	2SD ^a	n ^a
Doping experiments	0.4	0.710259	0.000019	0.01	0.03	2
	1	0.710259	0.000019	0.01	0.03	2
	2	0.710256	0.000019	0.01	0.03	2
	4	0.710278	0.000019	0.01	0.03	2
	10	0.710293	0.000019	0.01	0.03	2
Synthetic	3.E-05	0.710261	0.000019	0.00	0.03	2
solution	2.E-05	0.710250	0.000019	0.00	0.03	2
Average		0.710255	0.000014	0.00	0.01	4

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16 Note: ^a n is the number of repeated measurements of the same solution. 2SD = two
 17 times the standard deviation of N (N >30) repeat measurements of the in-house
 18 reference solutions during an analytical session.

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20 Table S3 The weight proportions of barite and matrices in synthetic barites and Sr
 21 isotope composition.
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Sample description ^b				Sample weight /mg	Sr in barite/ total Sr	⁸⁷ Sr/ ⁸⁶ Sr		2SD ^a	δ ⁸⁸ Sr	2SD ^a	n ^a
Barite	JLs-1	AGV-2	SGR-1			without leaching ^c	⁸⁷ Sr/ ⁸⁶ Sr				
10%	90%			10	82%	0.712518	0.713571	0.000004	-0.05	0.01	2
				10	82%	0.712518	0.713568	0.000019	-0.06	0.01	2
30%	70%			10	95%	0.713245	0.713553	0.000003	-0.08	0.00	2
50%	50%			10	98%	0.713419	0.713551	0.000032	-0.07	0.01	2
70%	30%			10	99%	0.713497	0.713562	0.000023	-0.06	0.01	2
90%	10%			10	100%	0.713541	0.713560	0.000014	-0.07	0.00	2
				10	100%	0.713541	0.713555	0.000007	-0.07	0.01	2
Average							0.713560	0.000015	-0.07	0.02	14
10%		90%		10	68%	0.710454	0.713556	0.000013	-0.05	0.02	2
				10	68%	0.710454	0.713520	0.000002	-0.07	0.01	2
30%		70%		10	89%	0.712498	0.713595	0.000008	-0.07	0.01	2
50%		50%		10	95%	0.713072	0.713553	0.000011	-0.06	0.03	2
70%		30%		10	98%	0.713343	0.713546	0.000009	-0.07	0.01	2
90%		10%		10	99%	0.713500	0.713562	0.000017	-0.06	0.02	2
				10	99%	0.713500	0.713526	0.000002	-0.07	0.01	2
Average							0.713551	0.000042	-0.07	0.01	14
10%			90%	10	76%	0.713231	0.713555	0.000017	-0.04	0.02	2
				10	76%	0.713231	0.713544	0.000005	-0.05	0.03	2
30%			70%	10	93%	0.713454	0.713546	0.000005	-0.07	0.02	2
50%			50%	10	97%	0.713511	0.713545	0.000013	-0.04	0.00	2
70%			30%	10	99%	0.713536	0.713558	0.000016	-0.08	0.02	2
90%			10%	10	100%	0.713550	0.713552	0.000021	-0.08	0.02	2
				10	100%	0.713550	0.713530	0.000019	-0.05	0.01	2
Average							0.713547	0.000018	-0.06	0.04	14
10%	30%	30%	30%	10	75%	0.712155	0.713555	0.000010	-0.06	0.02	2
				10	75%	0.712155	0.713552	0.000004	-0.07	0.01	2
25%	25%	25%	25%	10	90%	0.712995	0.713551	0.000000	-0.06	0.00	2
				10	90%	0.712995	0.713559	0.000009	-0.07	0.01	2
40%	20%	20%	20%	10	95%	0.713261	0.713558	0.000000	-0.09	0.02	2
				10	95%	0.713261	0.713582	0.000001	-0.07	0.02	2
50%	17%	17%	17%	12	96%	0.713356	0.713575	0.000013	-0.06	0.02	2
				12	96%	0.713356	0.713567	0.000002	-0.06	0.01	2
70%	10%	10%	10%	10	98%	0.713469	0.713554	0.000008	-0.07	0.00	2
				10	98%	0.713469	0.713570	0.000008	-0.09	0.01	2
				10	98%	0.713469	0.713545	0.000021	-0.07	0.01	2
Average							0.713556	0.000013	-0.07	0.02	22
100%							0.707825	0.000014	—	—	3

100%	0.703984	0.000004	—	—	3
100%	0.712181	0.000022	—	—	3

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24 Note: ^a n is the number of repeated measurements of the same solution. When n>2, 2SD
25 = 2 times standard deviation of the population of n repeated measurements; otherwise,
26 2SD = two times the standard deviation of N (N >30) repeat measurements of the in-
27 house reference solutions during an analytical session. ^b Sample description describes
28 the proportion of different standards, and the weight is the total weight of synthetic
29 barites. ^c ⁸⁷Sr/⁸⁶Sr without leaching is the calculated ⁸⁷Sr/⁸⁶Sr of synthetic barites
30 without leaching according to conservation of mass.

Table S4 $\delta^{88}\text{Sr}$ and $^{87}\text{Sr}/^{86}\text{Sr}$ values of five natural barite standards

Sample	$^{87}\text{Sr}/^{86}\text{Sr}$	2SD ^a	n ^a	$\delta^{88}\text{Sr}(\text{‰})^{\text{a}}$	2SD ^a	n ^a
GBW07811	0.711719	0.000019	2	-0.06	0.03	2
(M ^b =8)	0.711740	0.000019	2	-0.06	0.03	2
	0.711744	0.000019	2	-0.05	0.03	2
	0.711758	0.000019	2	-0.04	0.03	2
	0.711749	0.000019	2	-0.06	0.03	2
	0.711702	0.000019	2	-0.07	0.03	2
	0.711739	0.000019	2	-0.07	0.03	2
	0.711743	0.000019	2	-0.06	0.03	2
Average	0.711738	0.000039	16	-0.06	0.03	16
GBW07812	0.708333	0.000019	2	0.30	0.03	2
(M ^b =11)	0.708337	0.000019	2	0.32	0.03	2
	0.708320	0.000019	2	0.33	0.03	2
	0.708336	0.000019	2	0.30	0.03	2
	0.708336	0.000019	2	0.30	0.03	2
	0.708348	0.000019	2	0.30	0.03	2
	0.708334	0.000019	2	0.28	0.03	2
	0.708324	0.000019	2	0.32	0.03	2
	0.708324	0.000019	2	0.31	0.03	2
	0.708320	0.000019	2	0.33	0.03	2
	0.708325	0.000019	2	0.31	0.03	2
Average	0.708331	0.000017	22	0.31	0.03	22
GBW07815	0.714318	0.000019	2	-0.06	0.03	2
(M ^b =8)	0.714293	0.000019	2	-0.05	0.03	2
	0.714325	0.000019	2	-0.07	0.03	2
	0.714318	0.000019	2	-0.08	0.03	2
	0.714330	0.000019	2	-0.08	0.03	2

	0.714323	0.000019	2	-0.04	0.03	2
	0.714297	0.000019	2	-0.05	0.03	2
	0.714307	0.000019	2	-0.08	0.03	2
Average	0.714331	0.000027	16	-0.06	0.03	16
GBW07816	0.715169	0.000019	2	0.05	0.03	2
(M ^b =8)	0.715186	0.000019	2	0.06	0.03	2
	0.715222	0.000019	2	0.06	0.03	2
	0.715208	0.000019	2	0.05	0.03	2
	0.715198	0.000019	2	0.06	0.03	2
	0.715171	0.000019	2	0.10	0.03	2
	0.715170	0.000019	2	0.05	0.03	2
	0.715211	0.000019	2	0.06	0.03	2
Average	0.715192	0.000034	16	0.06	0.03	16
GBW07814						
(M ^b =23)	0.713555	0.000023	46	-0.06	0.02	28

Note: ^a n is the number of repeated measurements of the same solution. 2SD = two times the standard deviation of N (N >30) repeat measurements of the in-house reference solutions during an analytical session. ^b M is the number of independent digestions of the same standard powder.