

Supporting Information

Rapid *In Situ* Laser Digestion for High-Precision Barium Isotope Analysis of Barite Using Double Spike MC-ICP-MS

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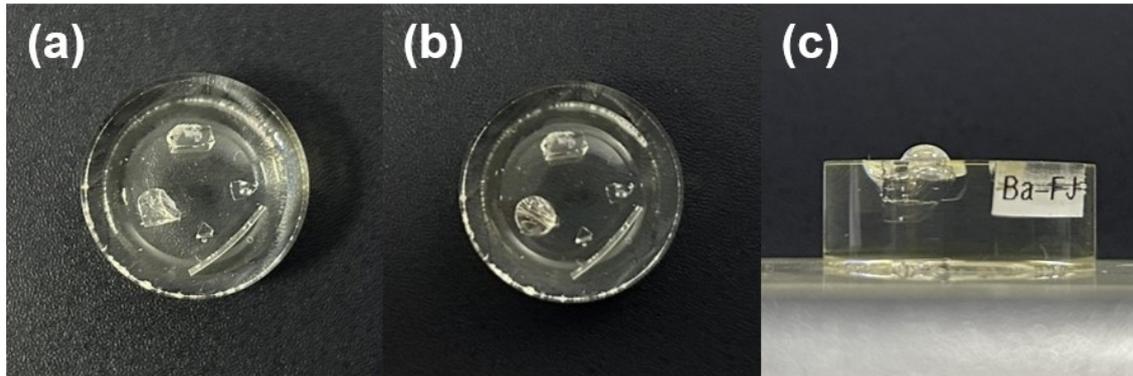
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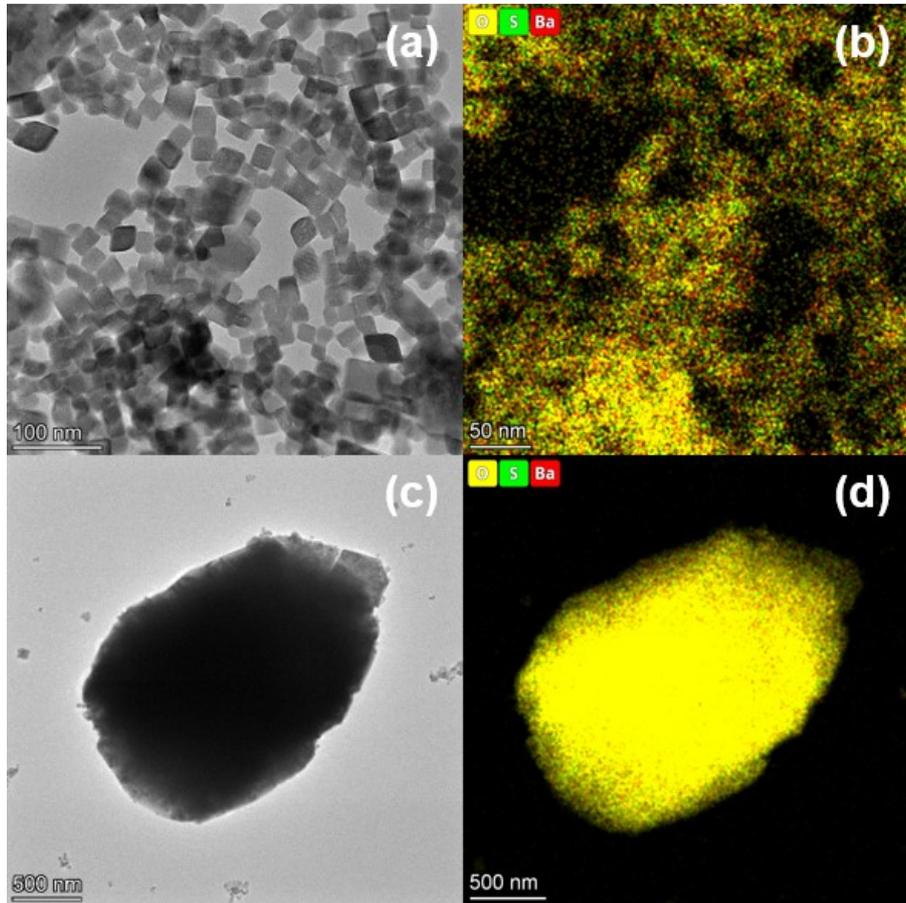
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(1) Fig. S1 Photos of the epoxy resin target containing natural barite Ba-FJ (a), and schematic diagrams of the water droplet formed by adding 10 μL Milli-Q water onto the surface of the barite particle (b, c).



(2) Fig. S2 TEM images of the solid phases (a, c) and corresponding EDS elemental mapping images (b, d) of barite Ba-FJ obtained using the rapid *in situ* laser digestion technique.



(3) Table S1. Operating conditions for rapid *in situ* laser digestion and isotope ratio measurements using MC-ICP-MS.

	MC-ICP-MS (Neptune Plus)
RF power	1200W
Cool gas flow rate	16.00 L min ⁻¹
Auxiliary gas flow rate	0.80-0.90 L min ⁻¹
Argon make-up gas flow rate	0.70-0.90 L min ⁻¹
Interface cones	X skimmer cone + Standard sample cone
Mass resolution	Low resolution
Intergeation time	2.097s, 4 block of 40 cycles
Cup-configuration for Ba isotope measurement	L4 (¹³¹ Xe), L2 (¹³⁴ Ba), L1 (¹³⁵ Ba), C (¹³⁶ Ba), H1 (¹³⁷ Ba), H2 (¹³⁸ Ba), H3 (¹⁴⁰ Ce)
	Aridus II
Solution uptake	~ 50 μ L min ⁻¹
Sweep gas flow rate	~ 4.20 mL min ⁻¹
Nitrogen gas	~ 7.00 mL min ⁻¹
Spray chamber temperature	110 °C
Desolvator temperature	160 °C
	Laser ablation system (GeoLas Pro)
Laser	ArF 193 nm laser
Wave length	193 nm
Plus length	15 ns
Energy density	2.5-4.5 J cm ⁻²
Ablation mode	Single spot
Spot sizes	60 μ m
Laser frequency	1-6 Hz

(4) Table S2. Isotope abundance (%) of ^{135}Ba - ^{137}Ba double spike.

Spikes	^{130}Ba	^{132}Ba	^{134}Ba	^{135}Ba	^{136}Ba	^{137}Ba	^{138}Ba
^{135}Ba single spike	0.0001	0.0006	0.0047	0.9338	0.0164	0.0089	0.0356
^{137}Ba single spike	0.0003	0.0003	0.0005	0.0010	0.0063	0.8190	0.1740
^{135}Ba - ^{137}Ba double spike	0.0007	0.0005	0.0033	0.6216	0.0130	0.2800	0.0819

(5) Table S3. Results of Ba mass recovered from the water droplet. The operating parameters were a droplet volume of 10 μL Milli-Q water, a laser fluence of $3 \text{ J}\cdot\text{cm}^{-2}$, a frequency of 4 Hz, and laser focusing directly at the sample surface.

NO.	Ba sampling mass (ng)
Round 1	142.7
Round 2	148.9
Round 3	149.7
Round 4	148.0
Round 5	150.3
Round 6	158.9
Round 7	145.7
Round 8	143.6
Average	148.5
$\pm 2\text{SD}$	10.1