Electronic Supplementary Information (ESI)

Accurate determination of Ba isotope ratios in barite samples by LA-MC-ICP-MS

Shenghua Zhang,[a] Wen Zhang,[a] Huimin Yu,[b] Fang Huang,[b] Chao Wang,[a] Tao Luo,[a] Yongsheng Liu,[a] Zhaochu Hu*[a]

[a] State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences, Wuhan 430074, China.

[b] CAS Key Laboratory of Crust-Mantle Materials and Environments, School of Earth and Space Sciences, University of Science and Technology of China, Hefei, Anhui 230026, China.

*Corresponding author

E-mail: zchu@vip.sina.com

Tel: 86-27-61055600

Fax: 86-27-67885096

Supplementary Information

A. The images of six natural barite

Six pieces of natural barites crystals from different origins (Fujian province, France, Yunnan Province, Jiangsu Province, Henan Province and Guizhou Province). The image data of these barites are shown in Fig. S1.

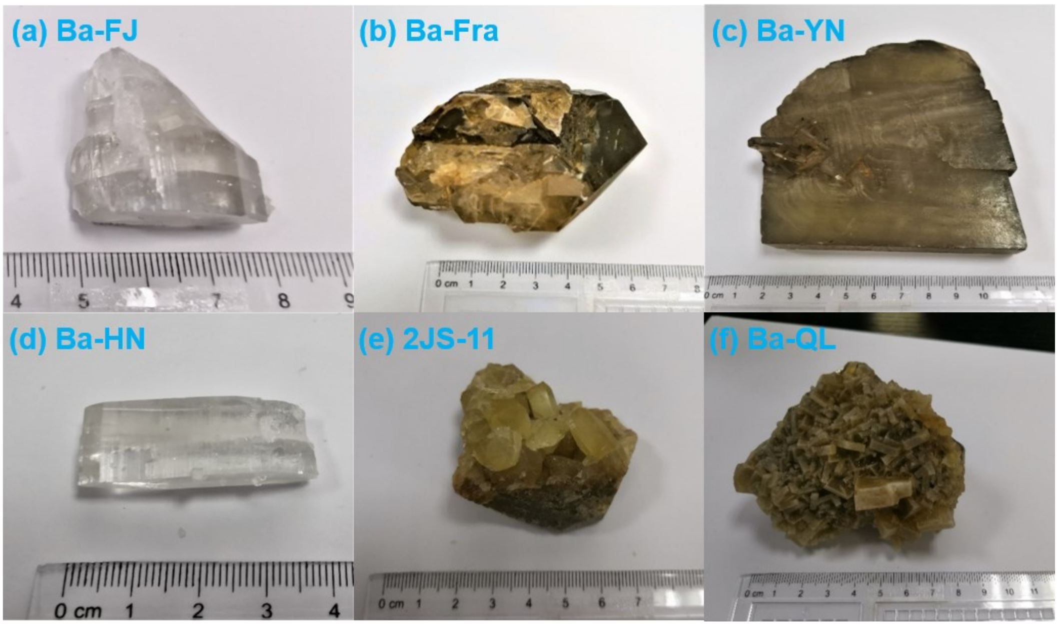

Fig. S1 Photographs of six natural barite crystals from different origins.

B. The pressed powder pellet and sintered barite sample NBS127, IAEA-SO-5 and IAEA-SO-6

The images of NBS127 pressed powder pellet and sintered sample NBS127, IAEA-SO-5 and IAEA-SO-6 are shown in Fig. S2.

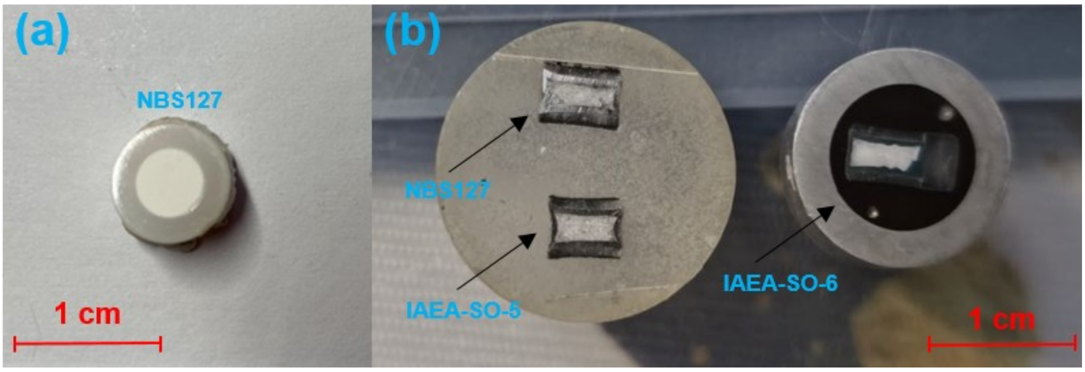

Fig. S2 Photographs of pressed powder pellet NBS127 (a) and sintered barite sample NBS127, IAEA-SO-5 and IAEA-SO-6 (b).

C. The wave signal-smoothing device

Fig. S3 shows the signal smoothing device reported by Hu *et al.*,[49] suitable for routine ICP-MS optimization and low repetition rate laser ablation analysis, was employed to achieve smaller isotopic fractionation and better spatial resolution.

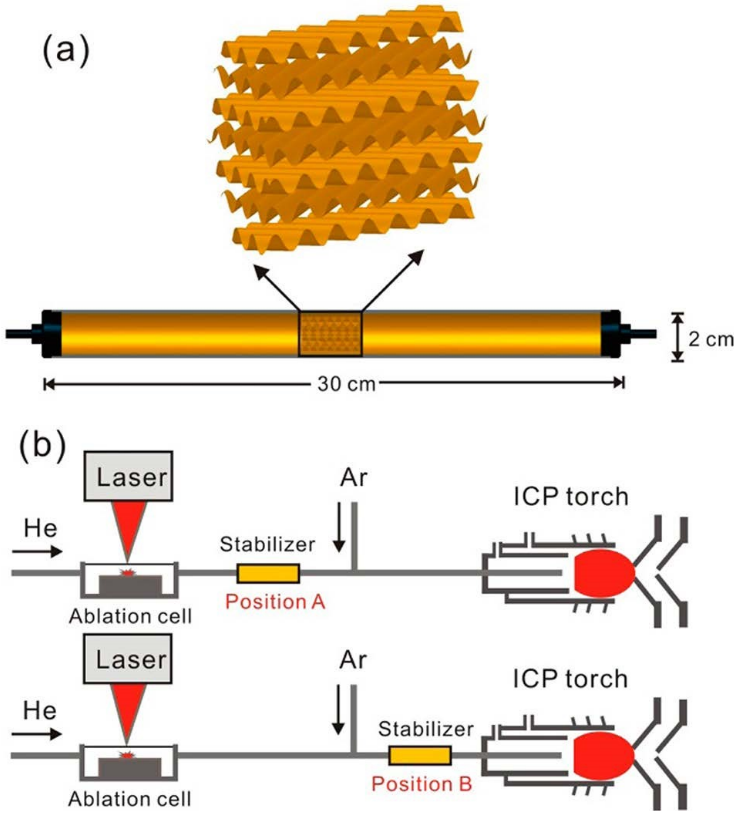

Fig. S3 Schematic diagram of (a) the wave signal-smoothing and mercury-removing device and (b) the connection position of the smoother (position A or B) in the LA-ICPMS system. In position A, only the helium carrier gas flows through the stabilizer. In position B, both the helium carrier gas and the argon makeup gas flow through the stabilizer.[1]

D. List of the potential interferences on Ba isotopes in barite by LA-MC-ICP-MS

Table S1. The potential interferences on Ba isotopes in barites by LA-MC-ICP-MS. The isotope abundance is listed in brackets (%).

Faraday cups	Isotopes	Isobaric interferences	Polyatomic interferences
L3	**$^{130}Ba^+$(0.106)**	$^{130}Xe^+$(4.083) $^{130}Te^+$(33.799)	^{90}Zr(51.452)$^{40}Ar^+$(99.604) ^{114}Cd(28.730)$^{16}O^+$(99.76) ^{114}Sn(0.659)$^{16}O^+$(99.76)
L2	$^{131}Xe^+$(21.179)		
L1	**$^{132}Ba^+$(0.101)**	$^{132}Xe^+$(26.892)	^{92}Zr(17.146)$^{40}Ar^+$(99.604) ^{92}Mo(14.836)$^{40}Ar^+$(99.604) ^{116}Cd(7.490)$^{16}O^+$(99.76) ^{116}Sn(14.536)$^{16}O^+$(99.76)
C	**$^{134}Ba^+$(2.417)**	$^{134}Xe^+$(10.442)	^{94}Zr(13.380)$^{40}Ar^+$(99.604) ^{94}Mo(9.247)$^{40}Ar^+$(99.604) ^{133}Cs(100)$^{1}H^+$(99.99) ^{118}Sn(24.223)$^{16}O^+$(99.76)
H1	**$^{135}Ba^+$(6.592)**		^{95}Mo(15.920)$^{40}Ar^+$(99.604) ^{119}Sn(8.585)$^{16}O^+$(99.76)
H2	**$^{136}Ba^+$(7.853)**	$^{136}Xe^+$(8.869) $^{136}Ce^+$(0.186)	^{96}Zr(2.799)$^{40}Ar^+$(99.604) ^{96}Mo(16.676)$^{40}Ar^+$(99.604) ^{120}Sn(32.593)$^{16}O^+$(99.76) ^{120}Te(0.096)$^{16}O^+$(99.76)
H3	**$^{137}Ba^+$(11.232)**		^{97}Mo(9.555)$^{40}Ar^+$(99.604) ^{121}Sb(57.213)$^{16}O^+$(99.76)
	$^{138}Ba^+$(71.699)	$^{138}La^+$(0.09) $^{138}Ce^+$(0.251)	^{98}Mo(24.133)$^{40}Ar^+$(99.604) ^{98}Ru(1.869)$^{40}Ar^+$(99.604) ^{122}Sn(4.629)$^{16}O^+$(99.76) ^{122}Te(2.603)$^{16}O^+$(99.76)

References

1 Z. Hu, W. Zhang, Y. Liu, S. Gao, M. Li, K. Zong, H. Chen and S. Hu, *Anal. Chem.,* 2015, **87**, 1152–1157.