Supplementary Information for

Hf-W dating of zircon in mesosiderite with high-pressure sintered standard

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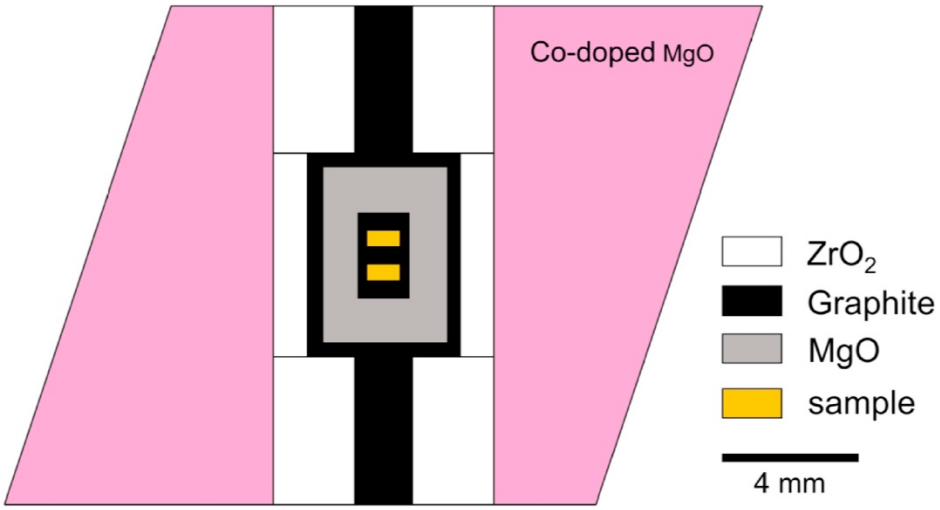
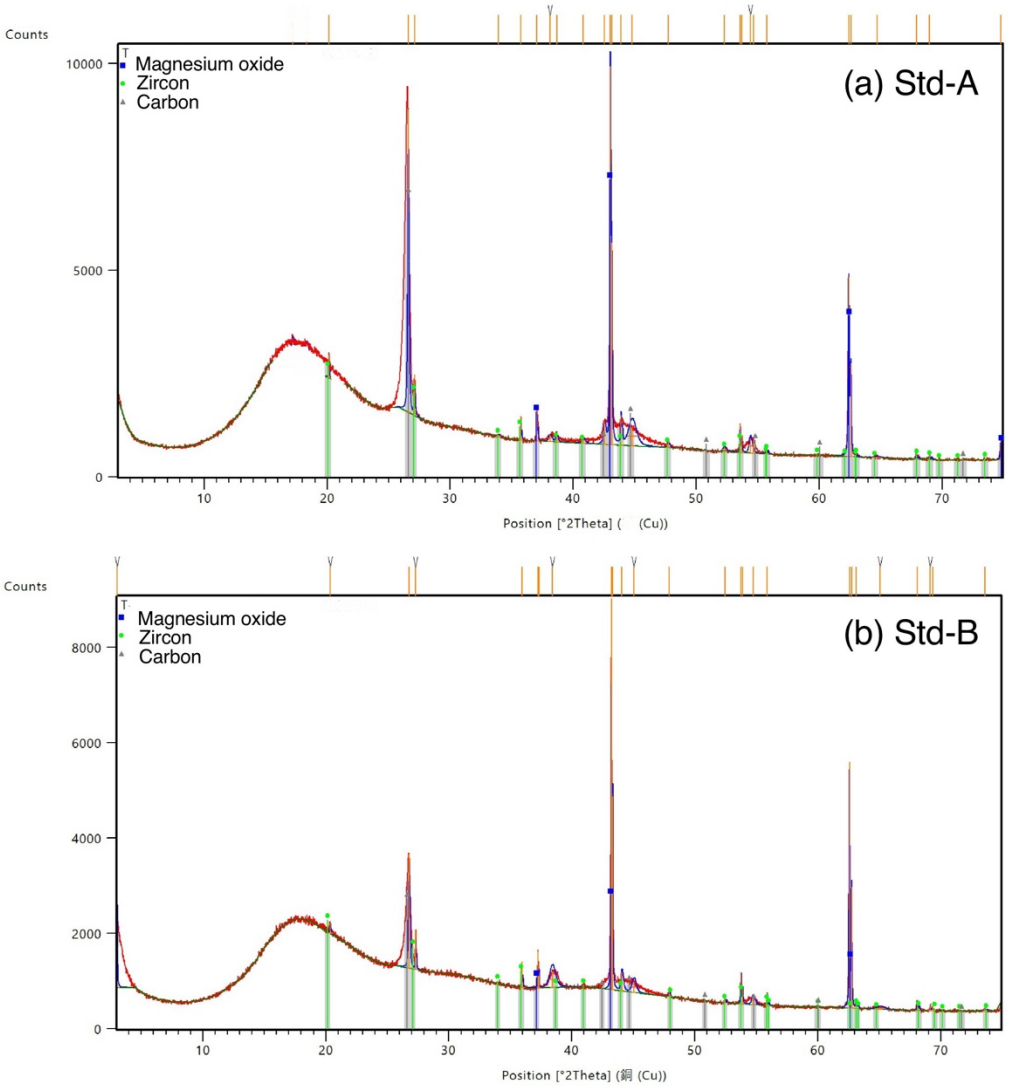
(a) Kawai-type multi-anvil press “ORANGE-3000”

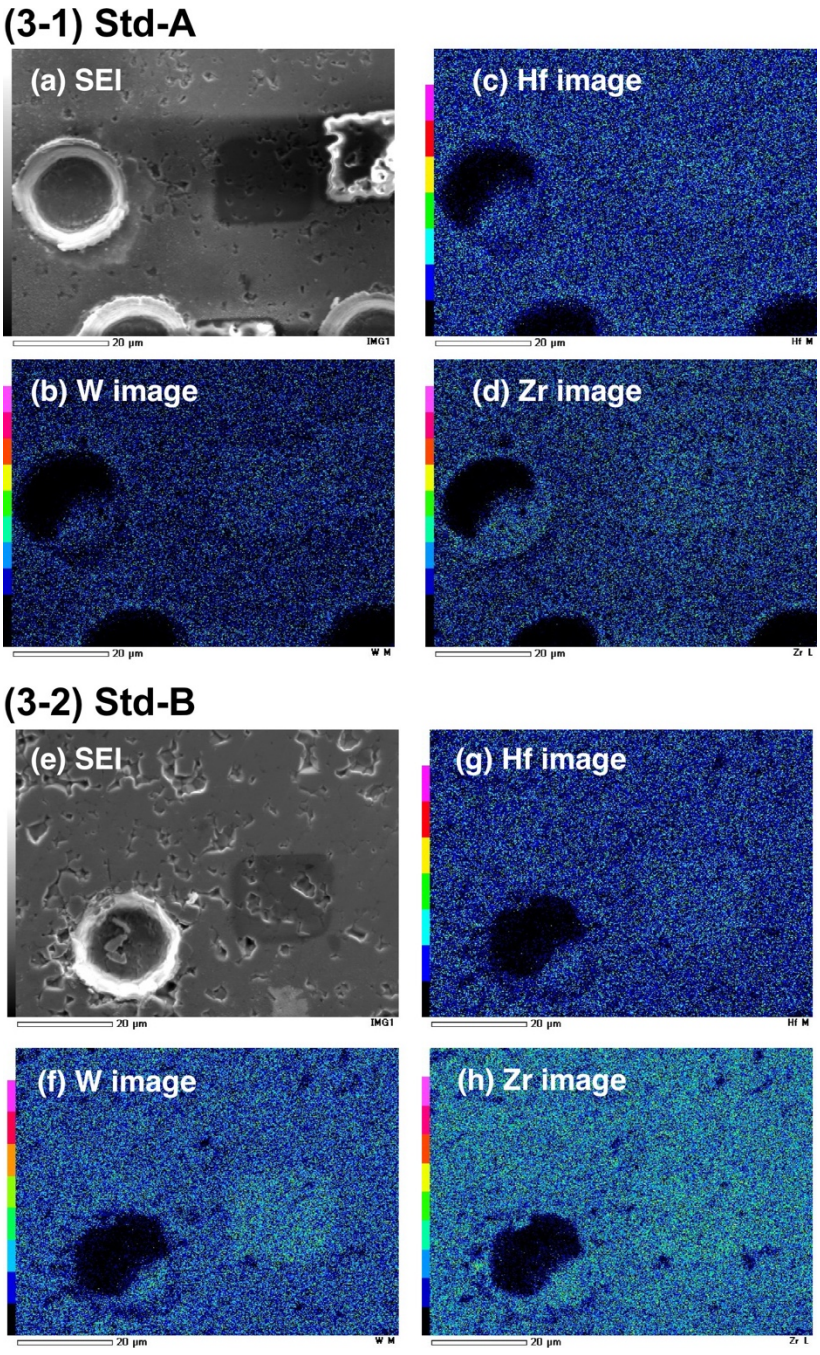
(b) Cell assembly for synthesis experiments



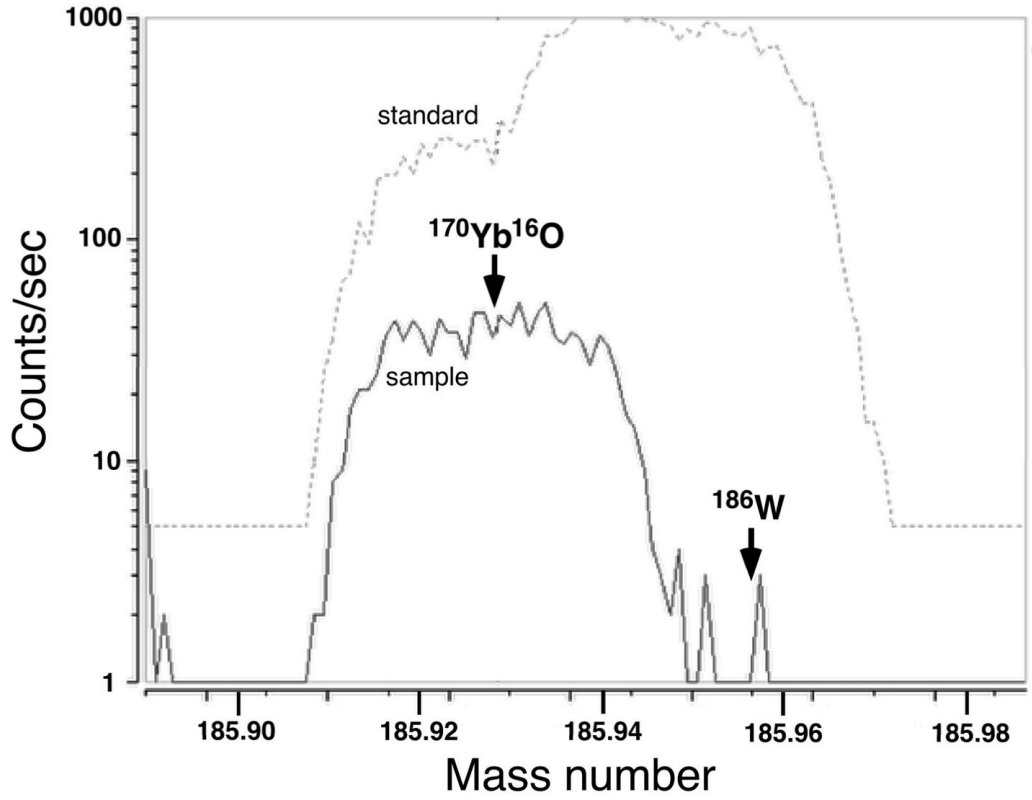
SFig. 1. Experimental tools of high pressure sintering of zircon standard installed at GRC, Ehime University. (a) overall picture of Kawai-type multi-anvil press “ORNGE-3000”. (b) cell assembly for synthesis experiments.



SFig. 2. X-ray diffraction analysis of two synthetic standard zircons. (a) XRD pattern of Std-A. Peaks of MgO, Zircon and graphite are observed. (b) XRD pattern of Std-B. Peaks of MgO, Zircon and graphite are also observed.



SFig. 3. SEM-EDS images of two synthetic standard zircons. (3-1) Enlarged images of Std-A for the red dotted square area in Fig. 3a. (a) SEI image, (b) W image, (c) Hf image, and (d) Zr image. (3-2) Enlarged images of Std-B for the red dotted square area in Fig. 3c. (e) SEI image, (f) W image, (g) Hf image, and (h) Zr image. Bars show 10 μm.



SFig. 4. Mass spectrum of natural zircon (solid curve) and standard glass (dotted curve) measured by NanoSIMS installed at AORI, University of Tokyo. Mass resolving power was set approximately 10,000 and the tailing effect of $^{170}Yb^{16}O$ on ^{186}W is fairly small.

Supplementary Table 1. Combination of magnetic field and multi-collector.

	Tr1	Tr2	Tr3	Tr4	Tr5
B1				$^{182}W^{+}$	
B2				$^{183}W^{+}$	
B3	$^{30}Si^{+}$	$^{96}Zr^{16}O_2^{+}$	$^{178}Hf^{+}$	$^{186}W^{+}$	$^{186}W^{16}O^{+}$

Supplementary Table 2. LA-ICPMS analysis of Std-A and B

No.	Zr (ppm)	Hf (ppm)	W (ppm)	Hf/W	Error (1 sigma)
Std-A					
1	446719	14299	34.6	413	59
2	439963	13993	37.5	373	54
3	443363	14027	39.0	359	52
4	441635	13868	40.4	343	49
5	449362	14127	42.1	336	48
6	457674	14575	42.6	342	49
7	451310	14490	44.0	330	47
8	453994	14547	46.6	312	45
9	448982	14529	41.5	350	50
10	443169	14421	43.6	331	48
11	447239	14314	43.0	333	48
12	449097	14363	39.2	367	53
13	441606	14163	39.8	356	51
14	449748	14412	34.3	421	61
15	452029	14427	34.9	413	60
16	445727	14087	37.8	373	54
17	451326	14233	39.7	359	52
18	460624	14517	48.8	297	43
19	462516	14495	51.8	280	40
20	467738	14796	57.4	258	37
21	474885	14958	55.4	270	39
Std-B					
1	478773	14945	1415	10.56	1.50
2	484932	15611	1822	8.57	1.22
3	483590	15746	1635	9.63	1.37
4	477301	15654	1372	11.41	1.62
5	472597	15448	1481	10.43	1.48
6	464138	15087	1353	11.15	1.59
7	476311	15612	1452	10.75	1.53
8	480398	15731	1224	12.86	1.83
9	484381	16074	1524	10.55	1.50
10	448121	14837	1963	7.56	1.08
11	455066	14885	1865	7.98	1.14
12	473719	14893	1457	10.22	1.45
13	483569	15440	1782	8.66	1.23
14	477870	15226	1451	10.49	1.49
15	476685	15312	1899	8.06	1.15

Supplementary Table 3. NanoSIMS analysis of Std-A and B

No.	Hf/W	Error (1 sigma)
Std-A		
1	725	69
2	612	61
3	633	62
4	682	82
5	479	48
Std-B		
1	19.4	0.4
2	13.5	0.5
3	15.7	0.4
4	14.5	0.5
5	17.8	0.5
6	17.5	0.6
7	21.5	0.6
8	11.6	0.3