Table DR1 EMP results of minerals in garnet peridotite (ZMF12) from the CCSD-PP1 (wt%)

mineral*	Grt			Ol	Opx	Cpx	Sp	Phl	Ol	Opx
notes	core	rim	matrix							in Grt
points	3	3	3	5	5	5	4	4	3	3
SiO_2	41.7	41.5	41.5	41.1	58.3	54.4	0.05	41.6	40.9	58.1
TiO_2	0.04	0.00	0.00	0.00	0.01	0.01	0.14	0.10	0.00	0.00
Al_2O_3	22.0	22.0	21.8	0.01	0.16	1.00	7.85	13.0	0.00	0.24
Cr_2O_3	2.23	1.92	1.93	0.01	0.08	1.08	41.1	0.37	0.00	0.21
FeO	7.95	11.1	11.1	8.22	5.22	2.07	42.2	2.53	8.13	5.34
MnO	0.39	0.76	0.82	0.08	0.13	0.04	0.20	0.01	0.05	0.13
MgO	20.7	19.2	19.0	49.9	36.0	16.5	3.83	25.7	50.0	36.0
CaO	5.03	3.82	4.22	0.00	0.09	22.7	0.00	0.01	0.00	0.09
Na_2O	0.01	0.01	0.00	0.00	0.01	1.34	0.00	0.60	0.01	0.02
K_2O	0.00	0.01	0.00	0.01	0.01	0.01	0.01	8.93	0.00	0.00
Total	100.0	100.3	100.3	99.3	100.0	99.2	95.4	92.8	99.1	100.0
$Mg^{\#}$	82.3	75.5	75.2	91.5	92.5	93.4	13.9	94.8	91.6	92.3
$Cr^{\#}$	6.36	5.53	5.61			42.2	77.8			
T (^{o}C)	802	793	796							
P (Kb)	54.0	51.6	52.5							

*, Mineral chemistry was analyzed using a Cameca SX-100 Electron Microprobe at GEMOC Key Centre (Macquarie University), operating at 15 kV and 20 nA.

Sp
3
0.00
0.28
6.48
46.4
37.2
0.00
5.50
0.00
0.00
0.00
95.9
20.9
82.8

Table DR2 U-Pb data for zircons in peridotite and its wall-rock gneiss from the CCSD-PP1

Sample	Size	Shape	Zoning	Measured ratios								Th	U	Th/U	Corrected ages (Ma)					
Grain ID	μm			$^{207}Pb/^{206}Pb$	1s	$^{207}Pb/^{235}U$	1s	$^{206}Pb/^{238}U$	1s	$^{208}Pb/^{232}Th$	1s	(ppm)	(ppm)		$^{207}Pb/^{206}Pb$	1s	$^{207}Pb/^{235}U$	1s	$^{206}Pb/^{238}U$	1s
ZMF12, peridotite																				
zmf12-49	130×150	I	N	0.05837	0.00516	0.27656	0.02422	0.03438	0.00060	0.01203	0.00074	9.41	20.1	0.47	544	167	248	19	218	4
zmf12-50	110×150	S	N	0.05831	0.00282	0.29359	0.01398	0.03653	0.00054	0.01219	0.00037	25.5	37.8	0.67	541	74	261	11	231	3
zmf12-54	80×110	I	N	0.04991	0.00295	0.23896	0.01402	0.03474	0.00050	0.01147	0.00040	20.6	36.7	0.56	191	108	218	11	220	3
zmf12-55	45×85	I	N	0.05036	0.00214	0.23992	0.01015	0.03456	0.00046	0.01118	0.00027	39.3	53.6	0.73	212	71	218	8	219	3
zmf12-56	65×75	R	N	0.04992	0.00176	0.24866	0.00869	0.03614	0.00046	0.01466	0.00166	34.7	61.7	0.56	191	56	225	7	229	3
zmf12-57	65×80	I	N	0.09179	0.01505	0.45717	0.07388	0.03614	0.00111	0.03341	0.00532	1.21	6.30	0.19	1463	273	382	51	229	7
zmf12-58	50×90	S	N	0.05058	0.00129	0.25081	0.00637	0.03597	0.00043	0.01130	0.00026	38.3	98.2	0.39	222	36	227	5	228	3
zmf12-59	70×110	S-I	N	0.05528	0.00068	0.26338	0.00303	0.03517	0.00046	0.01191	0.00025	70.3	86.4	0.81	424	13	237	2	223	3
zmf12-60	60×110	S	N	0.06665	0.00184	0.31625	0.00596	0.03525	0.00084	0.01262	0.00418	1.75	10.7	0.16	827	22	279	5	223	5
zmf12-61	70×130	I	N	0.06110	0.00093	0.28293	0.00346	0.03439	0.00052	0.01163	0.00044	22.4	35.2	0.64	643	14	253	3	218	3
zmf12-62	100×180	S	I	0.03701	0.00219	0.17678	0.00874	0.03547	0.00125	0.02141	0.01330	0.54	6.17	0.09	471	284	165	8	225	8
zmf12-63	90×100	R	N	0.05359	0.00074	0.25123	0.00300	0.03481	0.00049	0.01122	0.00031	38.0	46.7	0.81	354	14	228	2	221	3
zmf12-64	55×65	R	N	0.05046	0.00066	0.23156	0.00271	0.03403	0.00046	0.01105	0.00023	64.8	63.0	1.03	216	14	211	2	216	3
zmf12-65	75×105	S	N	0.08956	0.00130	0.43518	0.00503	0.03608	0.00054	0.01578	0.00044	26.2	33.8	0.78	1416	13	367	4	228	3
ZMF10, paragneiss																				
zmf10-1	60×90	S-R	N	0.06376	0.00099	0.84692	0.01341	0.09644	0.00117	0.03209	0.00044	502	380	1.32	734	32	623	7	594	7
zmf10-3	50×75	I	I	0.06018	0.00076	0.25684	0.00306	0.03096	0.00030	0.02459	0.00049	30.6	421	0.07	610	27	197	2	232	2
zmf10-4	70×110	S	I	0.06304	0.00080	0.49089	0.00594	0.05649	0.00056	0.02401	0.00025	175	146	1.20	710	27	406	4	354	3
zmf10-5	50×95	S	N	0.05632	0.00085	0.26072	0.00388	0.03360	0.00037	0.01391	0.00029	88.9	383	0.23	464	33	235	3	213	2
zmf10-6	110×175	I	O	0.11527	0.00175	0.88061	0.01225	0.05542	0.00059	0.04651	0.00068	51.8	94.2	0.55	1884	27	641	7	348	4
zmf10-7	50×80	I	I	0.05411	0.00131	0.25805	0.00598	0.03460	0.00035	0.01558	0.00084	5.67	40.3	0.14	375	53	233	5	219	2
zmf10-8	110×220	I	N	0.05842	0.00092	0.40789	0.00608	0.05065	0.00051	0.02237	0.00031	94.7	131	0.72	546	34	347	4	319	3
zmf10-10	65×90	I	N	0.05143	0.00083	0.26073	0.00389	0.03678	0.00035	0.01149	0.00048	23.2	267	0.09	260	37	235	3	233	2
zmf10-12	75×95	I	I	0.09609	0.00205	0.46182	0.00942	0.03486	0.00046	0.06162	0.00174	0.05	0.17	0.33	1550	40	386	7	221	3
zmf10-13	65×80	S-R	I	0.06224	0.00106	0.60888	0.00985	0.07096	0.00074	0.02921	0.00046	24.1	193	0.13	683	36	483	6	442	4
zmf10-14	75×100	I	N	0.06949	0.00085	0.78492	0.00871	0.08194	0.00076	0.02785	0.00026	71.8	91.1	0.79	913	25	588	5	508	5
zmf10-16	55×130	S	N	0.05350	0.00089	0.25328	0.00415	0.03434	0.00038	0.01873	0.00098	1.76	2.02	0.87	350	37	229	3	218	2
zmf10-17	55×85	S	N	0.06395	0.00076	0.82248	0.00920	0.09329	0.00090	0.02986	0.00029	10.4	227	0.05	740	25	609	5	575	5
zmf10-18	65×75	R	N	0.05273	0.00059	0.25786	0.00272	0.03547	0.00034	0.01685	0.00034	253	155	1.64	317	25	233	2	225	2
zmf10-21	60×140	S	I	0.05310	0.00103	0.26068	0.00476	0.03561	0.00037	0.01167	0.00062	0.21	0.11	1.81	333	43	235	4	226	2
zmf10-22	50×60	R	N	0.06410	0.00076	0.59077	0.00657	0.06685	0.00064	0.03164	0.00032	67.1	101	0.67	745	25	471	4	417	4
zmf10-23	65×100	S	N	0.05343	0.00063	0.27444	0.00311	0.03726	0.00037	0.01900	0.00033	36.1	355	0.10	347	26	246	2	236	2
zmf10-24	55×115	S	N	0.06578	0.00069	1.02667	0.00968	0.11320	0.00103	0.03846	0.00033	261	222	1.17	799	22	717	5	691	6
zmf10-25	70×110	I	I	0.06566	0.00085	0.58719	0.00730	0.06487	0.00066	0.03334	0.00039	65.3	107	0.61	796	27	469	5	405	4
zmf10-27	75×90	I	N	0.05160	0.00058	0.23909	0.00259	0.03361	0.00033	0.01486	0.00110	4.47	466	0.01	268	26	218	2	213	2
zmf10-28	75×105	I	I	0.06178	0.00076	0.54341	0.00629	0.06379	0.00061	0.02683	0.00027	93.4	102	0.92	667	26	441	4	399	4

R. round, I. irregular, S. subhedral, O. oscillatory, N. no internal structure; *, derived from comparison of average raw counts with GJ-1 standard in each run.

		com-Pb
$^{208}Pb/^{232}Th$	1s	%
242	15	0.0
245	7	0.0
231	8	0.0
225	5	0.0
294	33	0.0
664	104	0.0
227	5	0.0
239	5	0.0
253	83	0.0
234	9	0.0
428	263	0.0
226	6	0.0
222	5	0.0
316	9	0.0
638	9	0.0
491	10	0.0
480	5	0.0
279	6	0.0
919	13	0.0
312	17	0.0
447	6	0.0
231	10	0.0
1209	33	0.0
582	9	0.0
555	5	0.0
375	19	0.0
595	6	0.0
338	7	0.0
235	12	0.0
630	6	0.0
381	7	0.0
763	6	0.0
663	8	0.0
298	22	0.0
535	5	0.0

Table DR3 LAM-ICPMS analyses of trace elements of zircons in peridotite and its wall-rock gneiss from the CCSD-PP1

Sample	ZMF12										ZMF10							
Rock	peridotite										paragneiss							
Grain ID	49	50	54	56	57	59	60	61	62	63	1	4	6	8	10	12	14	16
Shape	I	S	I	S	I	S	S	I	S	S	S-R	S	I	I	I	I	I	S
Zoning	N	N	N	N	N	N	N	N	I	N	N	I	O	N	N	I	N	N
Age (Ma)	218	231	220	229	229	223	223	218	225	221	594	354	348	319	233	221	508	218
HfO_2*	1.37	1.32	1.52	1.44	1.49	1.44	1.32	1.49	1.31	1.51	1.22	1.20	1.82	1.71	1.07	1.77	1.60	1.89
P	66.6	70.2	77.3	77.9	82.5	78.9	71.4	74.7	70.8	73.6	1123	1042	1241	207	697	303	110	1089
Ti	9.39	4.52	0.86	1.76	5.29	3.91	1.29	1.23	6.81	13.5	133	56.8	33.7	717	37.2	43.4	399	1191
Mn	0.51	0.15	0.29	0.17	0.18	0.18	0.15	0.18	0.15	0.19	1.24	7.61	0.85	5.40	2.59	2.06	3.73	265
Fe	16.1	3.48	7.54	13.4	5.05	3.56	2.95	3.32	2.84	3.56	20.7	151	39.5	25.3	19.9	46.1	57.0	738
Sr	0.09	0.10	0.12	0.15	0.37	0.11	0.09	0.08	0.08	0.14	1.16	1.05	1.09	0.28	0.76	0.41	0.63	0.87
Y	28.8	22.9	30.6	50.6	135	20.7	25.8	19.4	21.1	34.5	4654	4245	6808	542	4575	779	112	3012
Nb	0.46	0.40	0.39	1.25	6.70	0.45	0.28	0.30	0.24	0.68	13.9	4.93	5.01	6.37	3.56	1.45	1.89	13.4
La	0.02	0.01	0.02	0.08	0.28	0.01	0.01	0.01	0.01	0.05	0.13	0.11	0.04	0.02	0.05	0.07	0.07	0.02
Ce	3.77	2.79	3.91	10.9	28.4	3.60	2.02	2.54	0.96	6.96	41.8	32.1	41.4	6.76	16.4	5.72	2.94	32.7
Pr	0.02	0.01	0.02	0.08	0.26	0.01	0.01	0.01	b.d.	0.05	0.29	0.33	0.50	0.07	0.34	0.08	0.05	0.23
Nd	0.28	0.15	0.27	0.92	2.73	0.13	0.09	0.10	b.d.	0.59	5.10	5.88	9.45	1.14	6.21	1.50	0.30	4.07
Sm	0.45	0.21	0.36	0.99	2.50	0.23	0.17	0.23	0.07	0.87	10.8	12.3	19.9	2.09	12.8	2.93	0.38	8.36
Eu	0.28	0.19	0.27	0.53	1.25	0.14	0.12	0.14	0.05	0.52	2.64	5.01	6.39	0.85	6.29	0.79	0.26	3.53
Gd	1.68	1.18	1.88	2.89	6.83	1.02	0.91	0.96	0.40	3.12	65.4	72.5	113	11.5	82.8	17.7	2.35	52.5
Dy	3.53	2.84	3.97	5.94	16.2	2.37	2.76	2.20	1.62	5.18	308	303	475	52.1	343	76.8	10.0	252
Ho	0.90	0.75	0.98	1.63	4.61	0.65	0.79	0.62	0.61	1.09	120	113	177	19.4	125	28.2	3.71	103
Er	3.07	2.35	2.87	5.95	17.8	2.14	2.65	2.01	2.78	3.22	552	500	787	86.7	544	123	16.1	488
Yb	4.29	3.03	3.49	11.4	31.8	2.69	3.35	2.53	5.09	3.63	1103	954	1525	185	1026	239	39.6	1021
Lu	0.60	0.43	0.50	2.01	4.89	0.39	0.48	0.39	0.90	0.59	194	165	257	30.9	171	39.9	6.29	187
Ta	0.27	0.23	0.32	0.55	1.01	0.34	0.22	0.24	0.20	0.41	5.05	1.14	1.40	0.84	0.77	0.43	0.48	1.83
Pb	0.31	0.23	0.46	0.88	1.36	0.34	0.10	0.09	0.05	0.81	12.1	13.9	10.2	1.49	5.74	2.67	3.08	6.20
Th	13.1	12.0	23.3	48.6	67.8	11.4	1.68	5.14	0.61	43.8	231	229	184	39.8	13.1	47.8	107	117
U	20.7	24.1	41.6	82.8	175	25.0	10.9	12.3	6.48	51.8	220	181	321	163	150	169	216	244
Th/U	0.63	0.50	0.56	0.59	0.39	0.45	0.15	0.42	0.09	0.85	1.05	1.26	0.57	0.24	0.09	0.28	0.49	0.48
Th/U#	0.47	0.67	0.56	0.56	0.19	0.81	0.16	0.64	0.09	0.81	1.32	1.20	0.55	0.72	0.09	0.33	0.79	0.87
CART	Kimb	Kimb	Kimb	Kimb	Carb	Kimb	Kimb	Kimb	Kimb	Kimb	Sy/Mon	Dole	Sy/Mon	Dole	Sy/Mon	Dole	Carb	Dole

*, EMP result (wt%); others, single point LAM-ICPMS analysis (ppm); Symobls in shape and zoning are same as in Table DR2;

#, derived from dating (see Table DR2); Rock type form CART (short-tree) of Beliusova et al. (2002): Kimb, kimberlite; Carb, carbomatite; Sy/Mon, Syenite/Monzonite; Dole, Dolerite; Gran1, Granltoid (<65% SiO_2); Gran2, Granltoid (70-75% SiO_2)

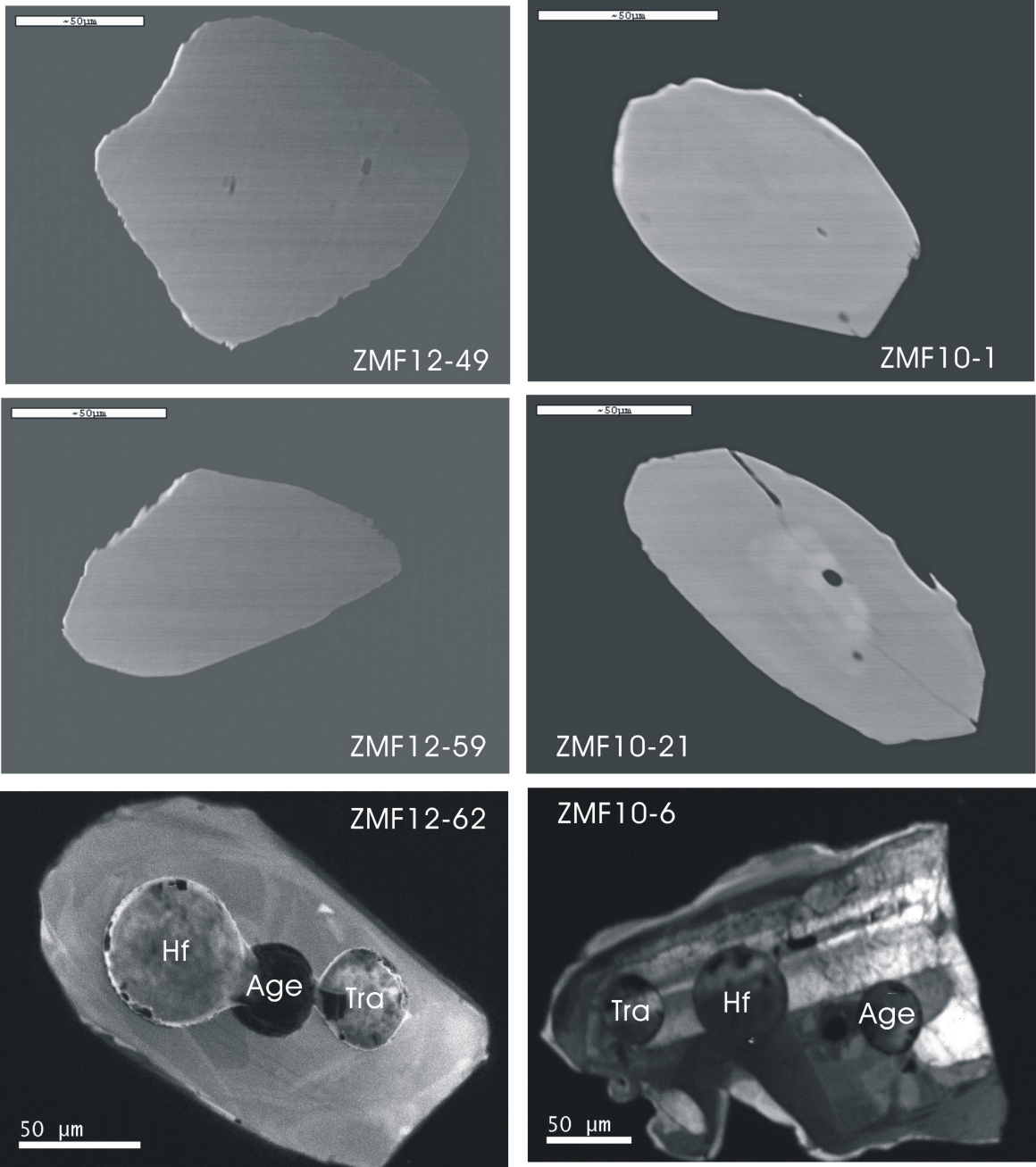
Table DR4 Hf-isotope analyses of zircons in peridotite and gneiss from the CCSD-PP1

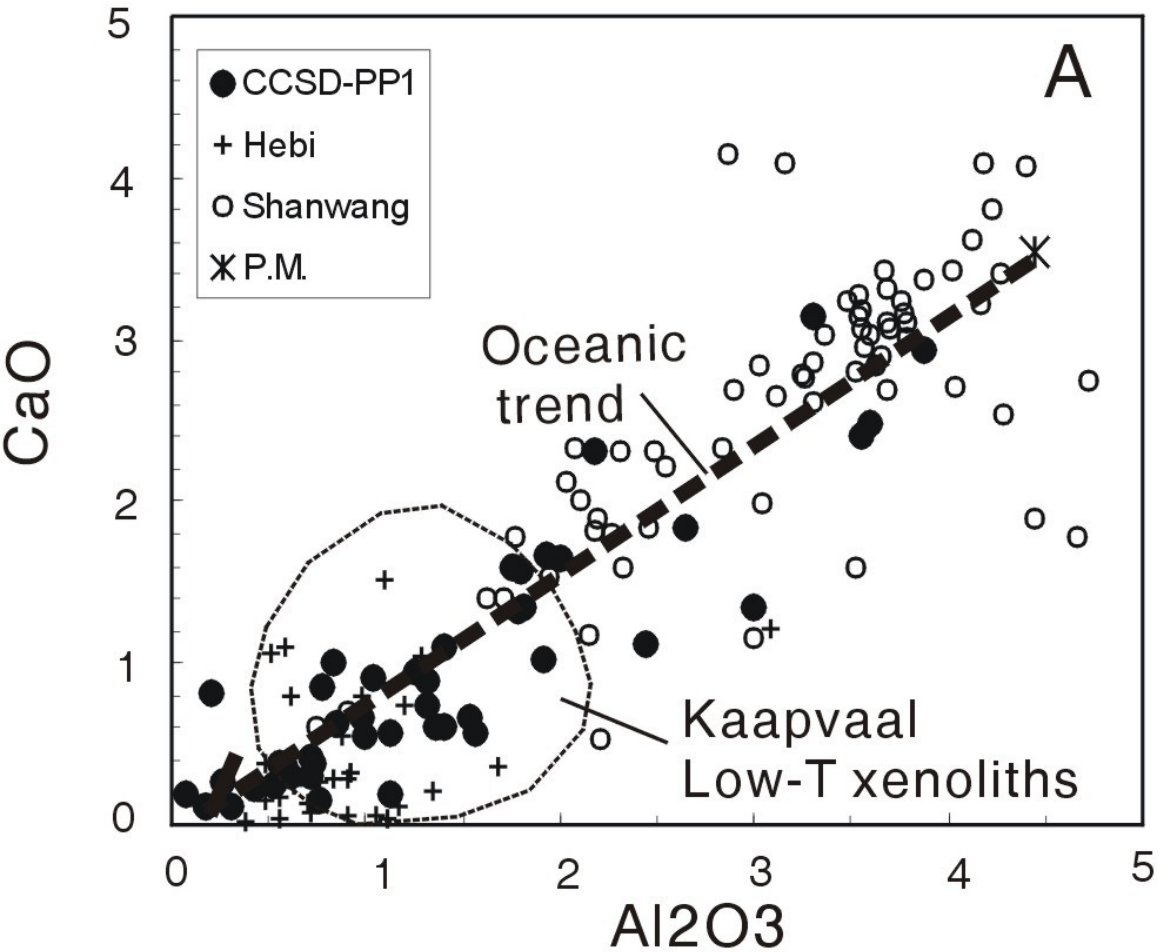
Sample	Shape	Zoning	Hf^{176}/Hf^{177}	1σ	Age (Ma)	Hf_i	ε_{Hf}	1σ
ZMF12, peridotite								
zmf12-49	I	N	0.282186	0.000015	218	0.282186	-16.0	0.5
zmf12-50	S	N	0.282240	0.000011	231	0.28224	-13.8	0.4
zmf12-54	I	N	0.282218	0.000016	220	0.282218	-14.8	0.6
zmf12-55	I	N	0.282227	0.000014	219	0.282227	-14.5	0.5
zmf12-56	R	N	0.282215	0.000012	229	0.282215	-14.7	0.4
zmf12-57	I	N	0.282198	0.000011	229	0.282198	-15.3	0.4
zmf12-58	S	N	0.282225	0.000015	228	0.282225	-14.4	0.5
zmf12-59	S-I	N	0.282173	0.000010	223	0.282173	-16.3	0.4
zmf12-60	S	N	0.282207	0.000012	223	0.282207	-15.1	0.4
zmf12-61	I	N	0.282212	0.000012	218	0.282212	-15.0	0.4
zmf12-62	S	I	0.282220	0.000015	225	0.28222	-14.6	0.5
zmf12-63	R	N	0.282197	0.000016	221	0.282197	-15.5	0.6
zmf12-64	R	N	0.282184	0.000023	216	0.282184	-16.1	0.8
zmf12-65	S	N	0.282196	0.000011	228	0.282196	-15.4	0.4
ZMF10, paragneiss								
zmf10-3	I	I	0.282623	0.000019	232	0.282622	-0.4	0.7
zmf10-4	S	I	0.282429	0.000016	354	0.282419	-7.5	0.6
zmf10-5	S	N	0.282458	0.000016	213	0.282449	-6.5	0.6
zmf10-6	I	O	0.282415	0.000015	348	0.282407	-8.0	0.5
zmf10-7	I	I	0.282444	0.000016	219	0.282433	-7.1	0.6
zmf10-8	I	N	0.282430	0.000170	319	0.282429	-7.2	6.0
zmf10-10	I	N	0.282541	0.000012	233	0.282541	-3.2	0.4
zmf10-12	I	I	0.282426	0.000015	221	0.282422	-7.4	0.5
zmf10-13	S-R	I	0.282505	0.000020	442	0.282502	-4.6	0.7
zmf10-16	S	N	0.282500	0.000012	218	0.282488	-5.1	0.4

T_{DM}, depleted mantle Hf model age; T_{crust}, average crustal Hf model age.

R round, I irregular, S subhedral, N no internal structure;

T_{DM} (Ga)	T_{crust} (Ga)
1.47	2.26
1.39	2.13
1.42	2.19
1.41	2.17
1.43	2.19
1.45	2.23
1.41	2.17
1.48	2.29
1.44	2.21
1.43	2.20
1.42	2.18
1.45	2.23
1.47	2.27
1.45	2.23
0.87	1.29
1.21	1.74
1.16	1.67
1.21	1.77
1.19	1.71
1.14	1.72
0.98	1.47
1.17	1.73
1.05	1.55
1.12	1.59


~50µm
ZMF12-49
~50µm
ZMF10-1
~50µm
ZMF12-59
~50µm
ZMF10-21
ZMF12-62
Hf
Age
Tra
50 µm
ZMF10-6
Tra
Hf
Age
50 µm


A
CCSD-PP1
Hebi
Shanwang
P.M.
Oceanic trend
Kaapvaal Low-T xenoliths
CaO
Al2O3
0
1
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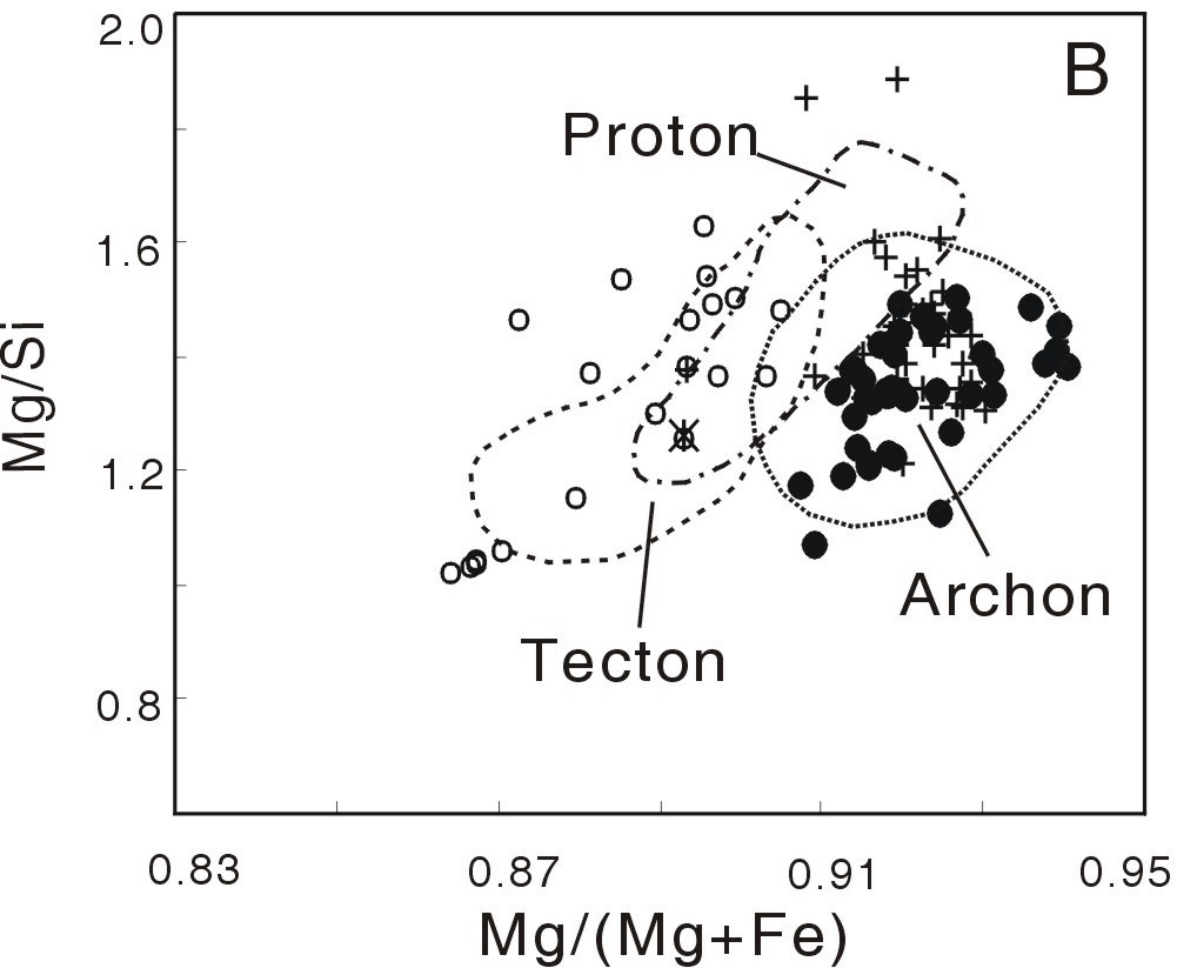
3
4
5


B
Proton
Tecton
Archon
Mg/Si
Mg/(Mg+Fe)
2.0
1.6
1.2
0.8
0.83
0.87
0.91
0.95