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Supplement of

Zircon luminescence dating revisited

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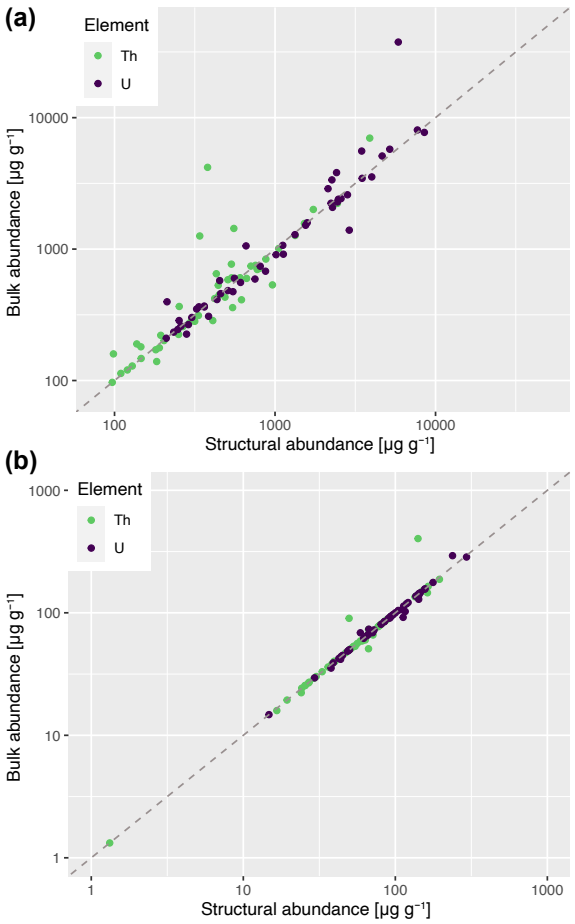

Figure S1. Comparison of Th and U contents determined by signal integration of the entire transient ablation signal, including inclusions and impurities (bulk), or the signal component related to the 'pure' zircon crystal structure (structural) for samples ZR229 (a) and Can1 (b). The dashed line represents the 1:1 line.

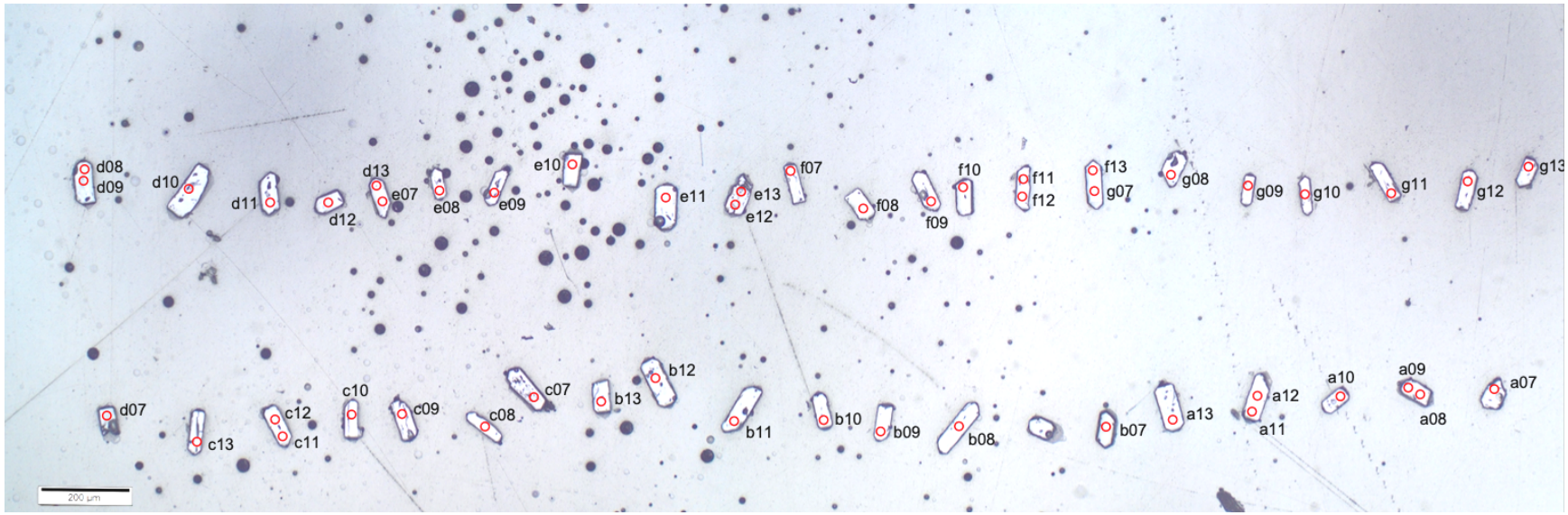

Figure S2. Scan of the mount with sample ZR229 with analytical spots indicated as red circles.

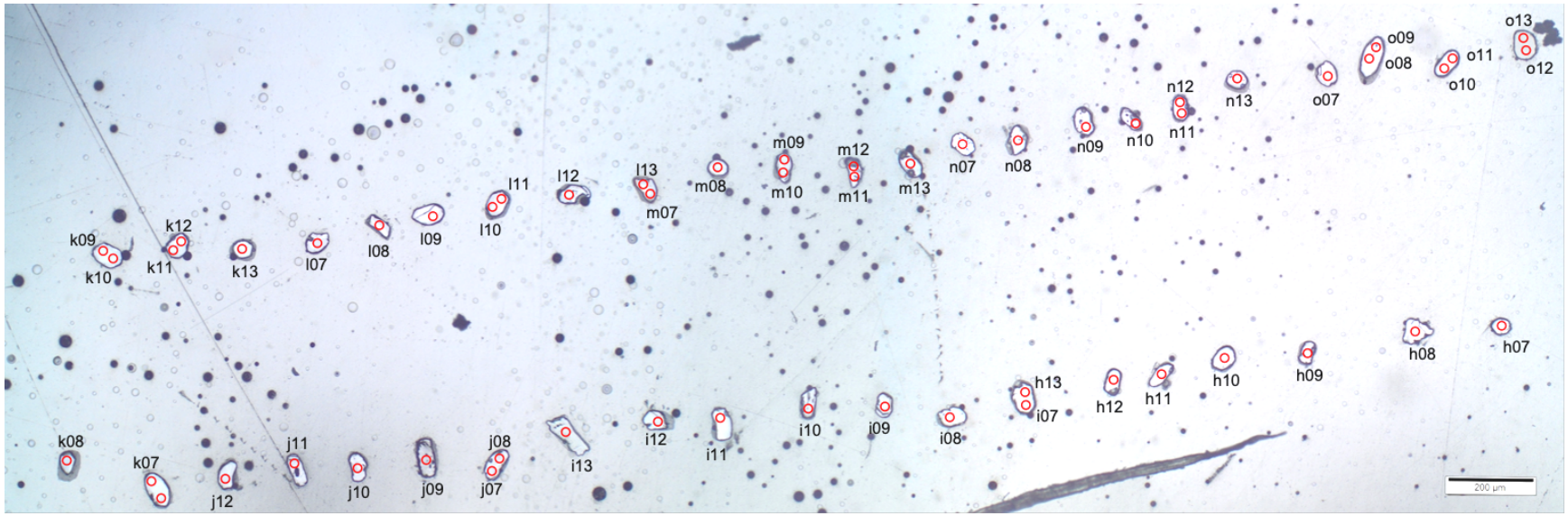

Figure S3. Scan of the mount with sample Can1 with analytical spots indicated as red circles.

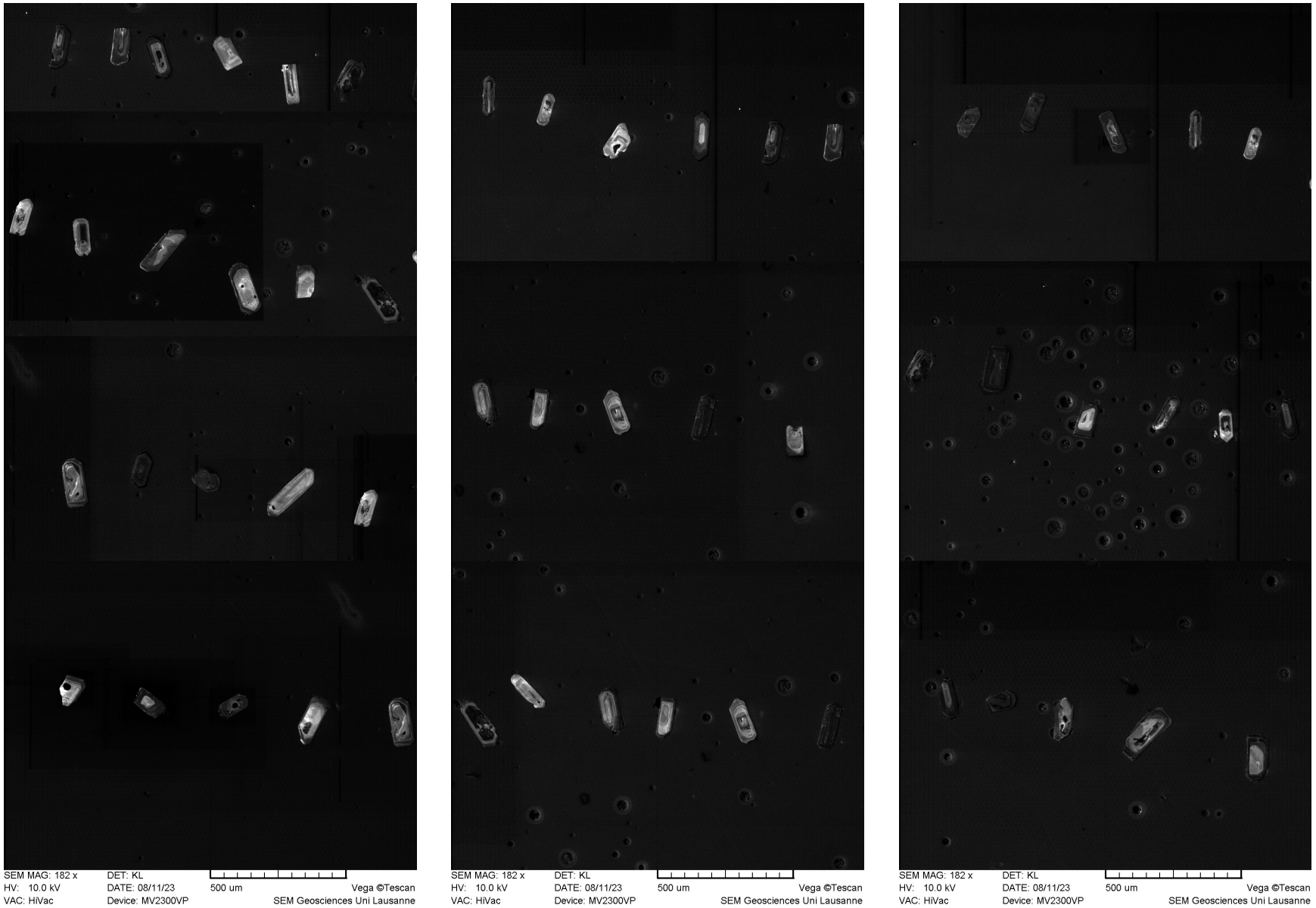

Figure S4. Cathodoluminescence images of the zircon sample ZR229.

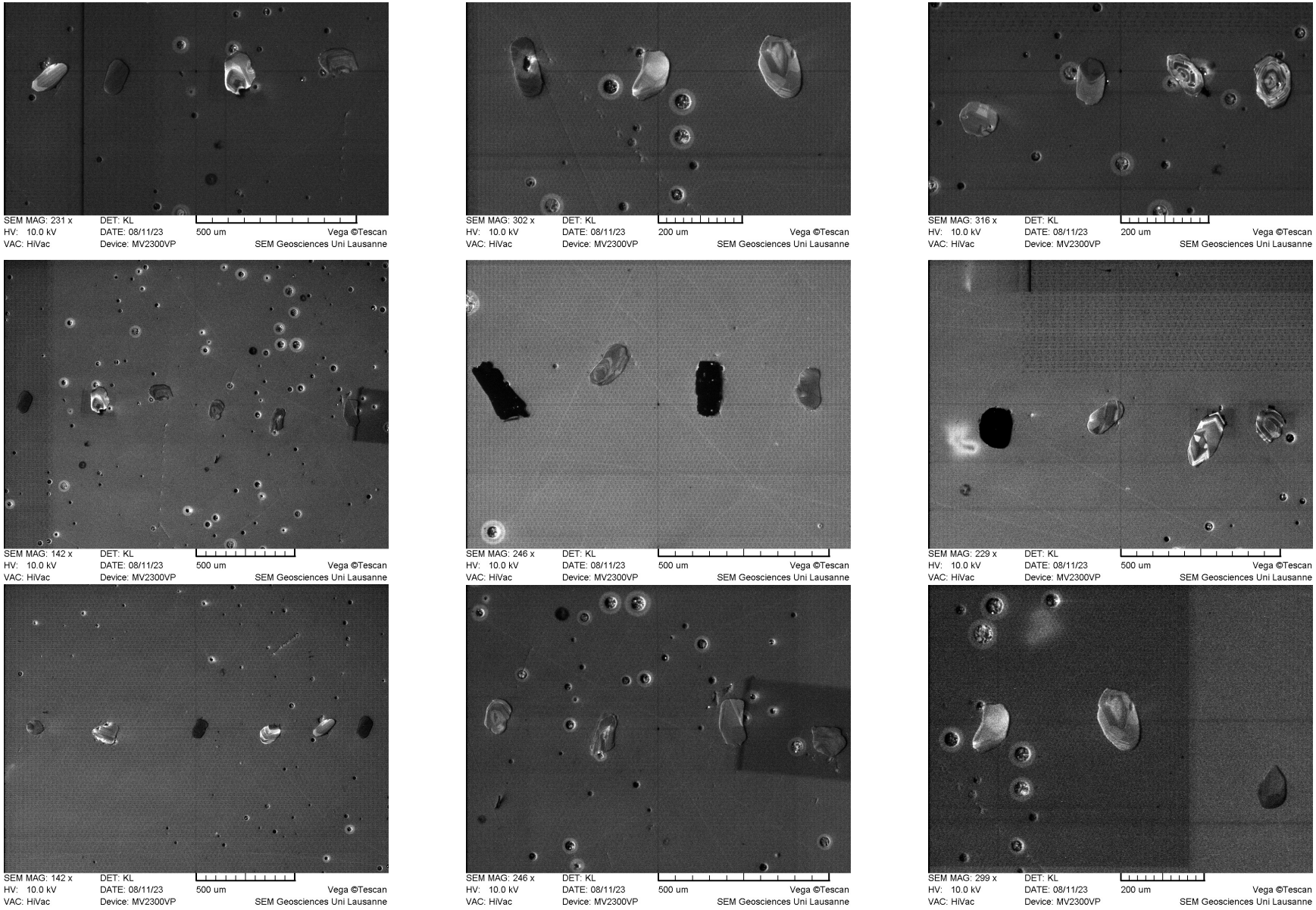

Figure S5. Cathodoluminescence images of the zircon sample Can1.

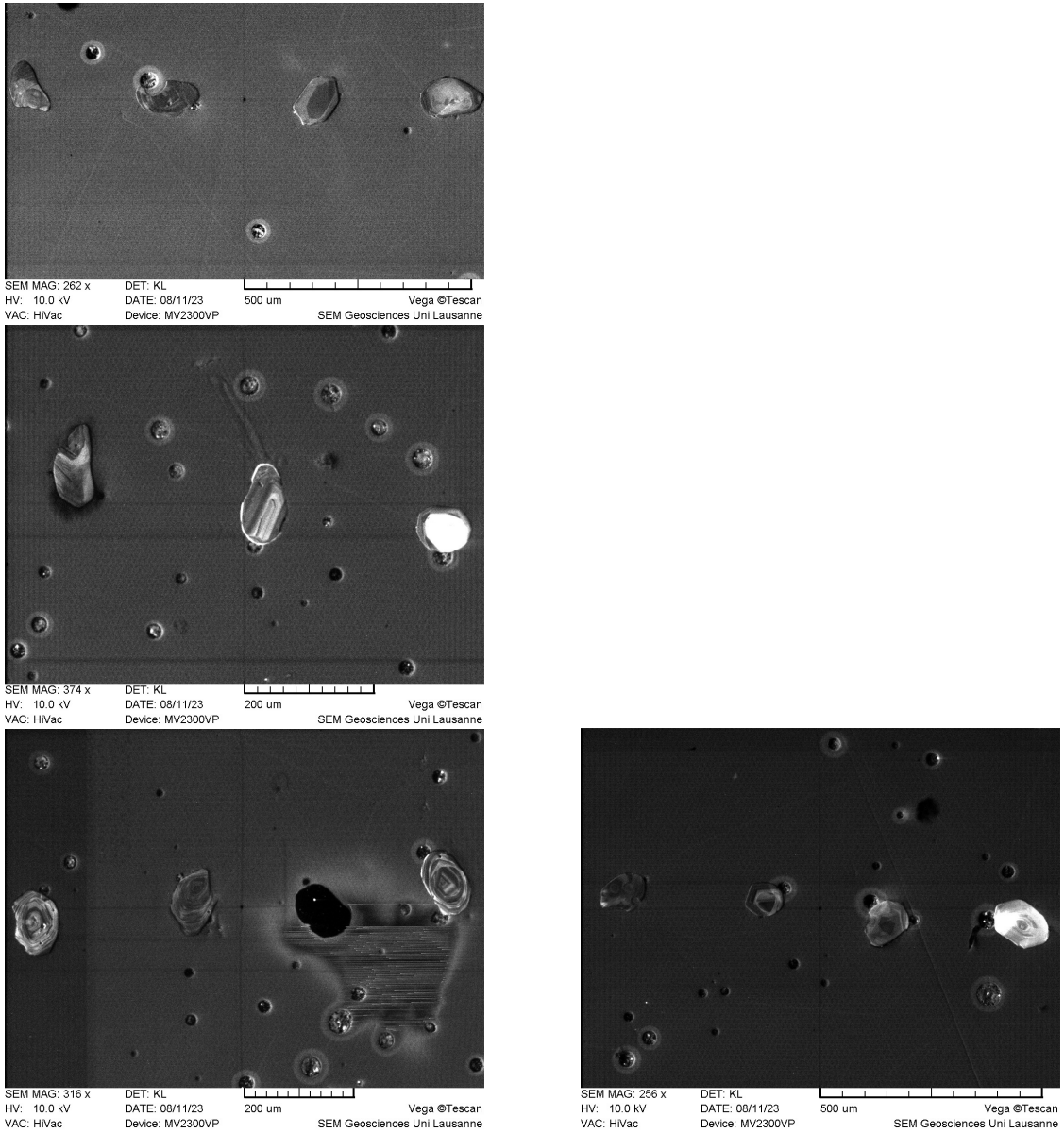

Figure S6. Cathodoluminescence images of the zircon sample Can1.

Table S1. Element contents (crystal structure) of sample ZR229, as determined by LA-ICP-MS. Red figures indicate data from two analytical spots on the same grain.

Isotopic mass	Location	Al2O3 27	SiO2 29	CaO 42	TiO2 49	Rb 85	Sr 88	Y 89	Nb 93	La 139	Ce 140	Pr 141	Nd 143	Sm 147	Eu 151	Gd 157	Tb 159	Dy 163	Ho 165	Er 166	Tm 169	Yb 172	Lu 175	Hf 178	Ta 181	Th 232	U 238
Spot ID		wt%	wt%	wt%	wt%	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}
oc03a07	Core	0.00217	32.9	0.0321	0.00132	0.540	0.384	836.0	3.13	0.0050	11.91	0.021	0.71	2.23	0.094	13.87	5.71	74.37	28.83	135.45	27.95	276.3	54.53	10728	1.404	146.5	362.1
oc03a08	Core	0.00073	32.9	n.d.	0.00101	0.303	0.352	1548.0	1.97	0.0784	11.74	0.298	4.83	8.55	0.779	38.77	13.04	151.31	55.00	238.30	46.04	413.3	78.85	8982	0.782	203.6	303.0
oc03a09	Rim	n.d.	32.9	n.d.	0.0007	0.772	0.630	2661.7	20.21	0.0041	21.03	0.030	1.12	4.06	0.175	32.98	14.29	203.72	84.07	426.19	94.53	901.8	172.40	11115	10.927	774.9	2827.2
oc03a10	Rim	0.00594	32.9	0.09979	0.00096	1.155	1.446	3510.6	28.37	0.0845	86.57	0.353	6.46	13.07	1.119	63.97	24.02	297.44	113.74	546.84	111.45	1057.6	193.88	11417	11.536	3892.1	3466.4
oc03a11	Rim	n.d.	32.9	0.03645	0.00068	0.388	0.353	1109.8	4.94	0.0734	17.03	0.088	1.29	3.40	0.185	20.88	7.84	101.15	39.17	179.71	37.52	341.8	67.20	10835	1.674	290.5	609.7
oc03a12	Core	0.00013	32.9	n.d.	0.00129	0.446	0.315	833.6	1.69	0.0132	10.15	0.059	1.27	2.94	0.252	17.11	6.04	73.31	27.92	129.44	26.33	250.2	48.69	8782	0.676	120.3	233.8
oc03a13	Core	0.0002	32.9	n.d.	0.00049	0.561	0.448	1789.1	2.31	0.0047	20.06	0.093	2.95	7.01	0.251	41.69	14.41	171.49	62.08	284.04	54.55	490.9	92.64	10933	1.061	316.1	546.8
oc03b07	Core	0.00115	32.9	n.d.	0.00018	0.440	0.518	2123.2	16.48	0.1152	12.82	0.092	1.19	3.02	0.108	25.62	12.16	162.47	68.83	340.17	78.03	738.4	142.60	11471	10.428	536.2	2262.2
oc03b08	Core	0.00031	32.9	n.d.	0.00045	0.878	0.279	1488.1	4.29	0.0064	21.20	0.149	2.31	5.16	0.241	32.36	10.92	138.49	53.57	251.16	49.13	437.0	84.95	9898	1.613	253.1	452.1
oc03b09	Rim	n.d.	32.9	n.d.	0.00169	0.308	0.275	898.6	1.76	0.0013	10.18	0.070	1.46	3.34	0.371	17.83	6.50	79.60	30.43	143.70	29.15	270.4	54.22	8708	0.697	109.5	210.0
oc03b10	Core	0.00054	32.9	n.d.	0.00024	1.888	1.646	7337.4	43.94	0.0290	16.98	0.073	1.92	9.53	0.015	81.24	40.33	588.27	242.51	1185.04	245.74	2195.7	406.01	13275	20.958	1053.2	8520.4
oc03b11	Core	0.00063	32.9	n.d.	0.00129	0.576	0.538	2149.0	3.78	0.0424	12.53	0.362	5.09	10.45	1.185	53.17	18.10	208.76	77.16	338.89	66.07	572.0	109.98	8794	1.231	266.7	435.2
oc03b12	Core	0.00034	32.9	n.d.	0.00205	0.624	0.639	1807.1	1.14	0.0185	9.28	0.388	6.39	9.46	1.115	47.48	15.20	168.17	60.75	270.38	52.80	448.8	83.77	8701	0.491	146.0	212.5
oc03b13	Core	0.05347	32.9	n.d.	0.00445	12.116	0.464	1795.0	1.51	0.0058	12.30	0.199	4.31	9.50	0.864	48.94	15.80	177.17	63.75	288.09	53.65	471.1	88.56	9383	0.595	190.3	288.4
oc03c07	Core	0.82877	32.9	0.74725	0.00177	2.212	50.834	3086.7	32.67	41.3481	279.73	26.933	151.74	52.85	2.033	69.56	21.34	249.91	94.01	532.07	129.85	1316.2	290.04	20594	41.987	380.0	5861.6
oc03c08	Core	0.00041	32.9	n.d.	0.00124	0.520	0.556	1614.3	2.43	0.0075	13.21	0.208	3.62	7.09	0.520	36.18	12.38	146.28	56.25	261.40	49.48	448.8	86.82	9256	0.886	194.1	335.7
oc03c09	Core	n.d.	32.9	n.d.	0.00121	0.965	0.594	3108.7	3.05	0.0435	20.50	0.701	11.32	21.45	2.800	87.33	27.38	306.74	106.87	470.71	91.46	791.1	145.68	8278	1.052	508.7	558.8
oc03c10	Core	0.00033	32.9	n.d.	0.00083	1.756	1.037	5600.2	7.80	0.1268	55.21	1.142	19.30	35.12	3.686	152.41	48.66	545.37	191.43	821.70	155.75	1329.8	248.63	8672	1.869	1334.9	1117.8
oc03c11	Rim	0.00021	32.9	0.04004	0.00139	n.d.	0.312	834.1	2.07	0.0034	10.04	0.067	1.44	3.40	0.314	17.57	6.08	73.51	27.80	130.78	26.50	250.2	49.06	8837	0.808	129.0	259.7
oc03c12	Core	0.00051	32.9	0.50275	0.00053	1.095	1.713	3128.8	5.66	6.5928	49.96	3.816	26.17	21.86	1.611	83.25	26.85	311.88	108.64	477.29	93.34	791.0	147.83	8876	1.388	618.1	750.2
oc03c13	Rim	0.00269	32.9	n.d.	0.00184	1.566	1.230	5681.3	9.00	0.0232	10.26	0.346	5.44	16.63	0.754	100.64	41.73	530.56	188.54	845.38	169.24	1498.4	293.64	10193	4.544	876.8	3490.0
oc03d07	Core	n.d.	32.9	n.d.	0.00044	0.498	0.405	1191.5	3.95	n.d.	18.74	0.067	1.36	3.95	0.157	22.00	8.08	102.96	39.99	195.47	38.77	353.5	70.45	10874	1.844	245.7	508.6
oc03d08	Rim	n.d.	32.9	n.d.	n.d.	0.757	0.814	2062.4	26.34	0.0097	15.76	0.031	0.80	3.49	0.035	26.95	12.43	177.30	70.53	346.19	74.77	689.3	133.52	12228	12.863	800.5	2577.9
oc03d09	Core	n.d.	32.9	n.d.	0.00083	0.416	0.546	2036.4	1.60	0.0226	13.62	0.368	6.29	11.63	1.163	52.46	17.04	195.94	70.91	312.62	60.22	534.5	104.27	8804	0.600	250.8	324.8
oc03d10	Core	0.00044	32.9	n.d.	0.00061	n.d.	0.450	540.7	4.15	0.0043	6.05	0.017	0.29	0.97	0.059	7.37	3.19	44.42	18.57	94.38	19.92	190.0	39.28	11592	2.126	96.8	362.7
oc03d11	Core	n.d.	32.9	n.d.	0.00046	n.d.	0.408	1515.1	5.19	0.2012	20.72	0.241	2.78	4.50	0.400	27.34	9.78	126.57	50.76	255.90	51.35	481.7	93.25	10635	1.885	339.7	659.9
oc03d12	Core	0.00597	32.9	0.60582	0.00051	2.052	2.148	5323.1	18.77	8.3564	58.40	5.827	34.39	22.61	0.494	88.39	34.05	442.47	170.06	813.03	179.89	1574.8	303.65	12000	9.452	1525.2	4007.3
oc03d13	Rim	0.00097	32.9	0.18454	0.00053	0.909	1.003	2580.3	15.62	7.3687	42.13	3.617	18.14	10.16	0.545	38.76	14.88	198.84	79.78	403.49	87.79	858.5	167.36	10769	8.350	755.5	2481.3
oc03e07	Core	0.00121	32.9	n.d.	0.00145	0.717	0.469	2238.8	2.59	0.0495	14.61	0.378	5.30	10.56	2.184	51.70	17.01	198.31	73.68	348.24	70.65	655.3	134.29	8638	1.103	487.8	808.8
oc03e08	Core	0.00081	32.9	0.20044	0.00181	1.554	1.064	4222.0	18.47	3.8664	97.15	2.716	19.49	21.95	1.066	105.06	34.97	411.78	144.68	638.35	126.04	1089.2	208.80	8553	5.008	2447.3	2447.2
oc03e09	Core	0.24391	32.9	n.d.	0.00074	2.901	0.825	2552.5	6.56	0.5876	31.13	0.463	6.75	12.19	0.966	61.90	19.85	233.31	83.49	401.61	75.32	657.6	127.19	9809	3.272	544.2	872.7
oc03e10	Core	n.d.	32.9	n.d.	0.00257	0.463	0.455	1136.1	2.85	0.0104	9.07	0.111	1.93	4.68	0.475	22.49	8.34	100.55	40.41	193.04	36.24	356.6	75.18	8758	0.809	137.6	252.6
oc03e11	Core	n.d.	32.9	n.d.	0.00059	1.043	0.861	3303.1	10.79	0.0077	19.05	0.060	1.65	5.61	0.118	45.83	20.71	285.33	116.68	577.36	119.92	1076.4	202.43	13357	6.985	963.7	2901.3
oc03e12	Core	0.0038	32.9	0.0457	0.00031	2.036	1.848	5703.0	98.64	0.1135	21.40	0.278	2.83	8.37	0.302	70.92	33.77	488.13	197.81	978.30	199.44	1736.7	329.46	15280	31.506	707.6	7711.3
oc03e13	Core	0.01568	32.9	0.04955	0.00234	2.255	2.200	3007.4	36.53	0.2624	9.55	0.293	2.27	3.18	0.427	25.59	13.36	202.42	99.96	588.40	140.02	1394.5	286.36	17091	19.879	442.8	5186.7
oc03f07	Rim	n.d.	32.9	n.d.	0.00052	n.d.	0.212	1114.6	3.79	0.0117	14.01	0.070	1.65	2.88	0.458	18.79	6.69	87.38	36.25	179.20	35.76	352.4	70.04	9976	1.085	180.7	385.5
oc03f08	Core	0.00037	32.9	n.d.	0.00148	0.619	0.316	1871.5	1.87	0.0209	9.46	0.298	5.94	10.66	1.002	45.72	15.52	181.63	64.93	309.64	60.04	502.9	96.81	9217	0.500	183.1	281.1
oc03f09	Rim	0.0291	32.9	n.d.	0.00194	2.923	0.653	1245.3	6.31	0.0676	17.93	0.119	1.56	3.39	0.282	20.50	8.07	101.71	39.76	204.66	44.59	396.1	84.86	12142	3.134	302.3	1014.7
oc03f10	Rim	n.d.	32.9	0.6526	n.d.	0.767	1.537	1626.6	13.35	16.5468	69.26	7.881	40.56	16.21	0.309	37.68	11.36	142.23	55.08	276.80	55.69	519.3	96.03	12784	7.908	430.8	1550.9
oc03f11	Rim	0.00641	32.9	0.08293	0.00106	1.776	1.379	5115.1	24.17	0.1881	25.53	0.447	5.70	13.78	0.352	85.54	33.88	438.72	165.55	779.97	163.73	1445.4	270.51	10827	12.164	1732.3	4651.1
oc03f12	Core	0.01462	32.9	n.d.	0.00111	0.839	0.480	2018.1	10.85	0.0201	8.60	0.103	2.07	6.21	0.262	40.61	15.12	175.65	64.26	306.21	63.57	583.2	115.12	11441	6.374	420.7	1586.4
oc03f13	Rim	0.00047	32.9	n.d.	0.00037	0.409	0.423	1323.3	11.44	0.0094	10.71	0.021	0.53	2.39	0.077	16.79	7.40	106.18	43.79	219.88	46.34	443.8	84.57	11992	6.546	333.1	1331.3
oc03g07	Core	0.00111	32.9	n.d.	0.00046	n.d.	0.292	569.9	1.69	0.0248	9.32	0.041	0.56	1.26	0.705	7.56	2.80	38.85	17.42	96.45	25.88	274.9	67.70	11452	1.062	98.5	248.1
oc03g08	Rim	0.00045	32.9	n.d.	0.00137	0.241	0.464	1356.3	3.76	0.8932	23.66	0.476	4.36	6.39	0.500	31.53	10.71	124.43	45.89	211.81	40.61	366.1	70.33	8245	1.059	449.0	458.3
oc03g09	Core	n.d.	32.9	n.d.	0.00039	0.522	0.341	1166.4	5.02	0.0248	15.75	0.087	2.01	4.29	0.183	24.78	8.40	101.74	39.78	192.20	40.60	386.0	80.08	10025	2.257	409.5	1127.1
oc03g10	Core	n.d.	32.9	0.29943	0.00024	0.488	1.279	2500.0	11.35	8.9813	42.70	4.465	22.48	10.42	0.198	38.04	15.00	200.00	80.48	393.98	84.65	787.5	153.98	11690	7.106	605.8	2233.6
oc03g11	Rim	0.00036	32.9	0.67713	0.00034	0.711	1.586	2646.3	17.72	19.5181	82.95	11.094	55.49	23.69	0.362	54.03	17.89	222.86	82.90	415.50	83.91	773.5	146.28	11799	8.647	665.0	2280.8
oc03g12	Rim	0.001	32.9	0.05621	n.d.	0.706	0.780	2386.0	11.34	0.0513	15.19	0.061	0.87	3.27	0.081	26.17	13.02	169.43	73.86	375.20	82.93	794.9	147.17	12790	7.637	534.9	2139.3
oc03g13	Rim	0.00089	32.9	n.d.	0.00045	0.649	0.608	2232.0	18.33	0.1886	13.94	0.119	1.21	3.40	0.076	25.99	12.41	173.52	70.43	358.44	78.46	757.8	141.84	12421	9.899	554.0	2417.4

Table S2. Element contents (crystal structure) of sample Can1, as determined by LA-ICP-MS. Red figures indicate data from two analytical spots on the same grain.

Isotopic mass	Location	Al2O3 27	SiO2 29	CaO 42	TiO2 49	Rb 85	Sr 88	Y 89	Nb 93	La 139	Ce 140	Pr 141	Nd 143	Sm 147	Eu 151	Gd 157	Tb 159	Dy 163	Ho 165	Er 166	Tm 169	Yb 172	Lu 175	Hf 178	Ta 181	Th 232	U 238
Spot ID		wt%	wt%	wt%	wt%	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}
oc03h07	Rim	0.01023	32.9	0.02382	0.00344	0.438	0.390	1422.6	0.73	0.0052	1.98	0.147	2.76	6.53	0.129	35.20	11.36	129.38	48.33	219.80	42.46	382.2	76.48	10012	0.296	53.4	97.0
oc03h08	Core	n.d.	32.9	n.d.	0.00165	0.425	0.271	1010.8	0.37	0.0087	6.78	0.170	3.52	6.31	1.461	27.67	8.76	96.38	33.81	144.55	29.07	247.4	48.05	8505	0.127	78.3	93.0
oc03h09	Core	0.00014	32.9	n.d.	0.00093	0.231	0.309	1071.1	10.52	0.7907	22.04	0.812	6.35	7.04	1.246	29.89	9.91	111.46	39.53	162.78	30.25	247.5	44.59	6970	3.151	64.5	142.8
oc03h10	Core	0.00142	32.9	n.d.	0.00446	n.d.	0.233	490.6	1.45	0.0082	7.59	0.090	1.30	2.29	0.367	12.40	3.94	46.36	17.15	74.41	14.64	132.6	25.67	8726	0.391	25.6	29.4
oc03h11	Core	0.00025	32.9	0.04073	0.0045	n.d.	0.327	896.0	0.63	0.0250	1.88	0.256	4.16	6.26	0.666	29.29	8.25	88.12	31.45	131.15	26.25	231.3	47.77	9544	0.199	24.1	37.8
oc03h12	Core	0.00019	32.9	n.d.	0.00264	1.019	0.583	3018.5	1.01	0.0123	2.71	0.194	3.56	8.77	2.247	64.45	22.71	274.74	104.17	459.18	86.66	748.9	139.38	8515	0.532	78.6	121.3
oc03h13	Core	0.00043	32.9	n.d.	0.00421	0.324	0.424	1090.1	1.27	0.0357	26.92	0.323	5.52	7.06	2.051	32.04	9.24	102.38	38.96	177.41	34.66	324.3	65.30	7178	0.419	66.6	66.9
oc03i07	Rim	n.d.	32.9	n.d.	0.00324	n.d.	0.311	640.0	1.02	0.0055	21.06	0.071	1.31	2.81	0.921	14.04	4.47	53.75	21.21	98.73	21.06	200.2	41.68	8399	0.354	38.3	44.9
oc03i08	Core	0.00045	32.9	n.d.	0.00359	n.d.	0.202	580.8	1.86	0.0025	12.75	0.046	0.73	1.72	0.275	10.43	3.70	48.49	18.95	90.15	19.15	178.0	35.62	9488	0.676	51.3	93.4
oc03i09	Core	0.00486	32.9	n.d.	0.00169	0.293	0.281	676.6	0.76	0.0631	7.94	0.208	3.60	5.05	0.317	20.84	6.45	66.77	23.20	97.41	18.81	167.0	31.46	10175	0.294	118.3	118.4
oc03i10	Core	0.00051	32.9	n.d.	0.0031	0.441	0.185	936.9	0.80	0.0094	17.62	0.127	2.28	3.89	1.327	21.60	7.20	82.13	31.34	148.03	29.17	280.0	55.16	9021	0.328	49.6	58.9
oc03i11	Core	0.00104	32.9	0.02561	0.00196	0.322	0.266	685.9	1.20	0.0034	18.84	0.116	2.13	3.74	0.565	16.64	4.87	58.38	21.94	100.88	20.55	194.2	38.84	10834	0.606	63.1	136.5
oc03i12	Core	0.00014	32.9	0.04766	0.00176	0.320	0.252	900.7	4.72	0.0520	8.40	0.099	1.29	2.43	0.272	15.47	5.95	75.60	30.05	144.82	29.83	263.2	52.61	9492	2.039	67.6	155.9
oc03j07	Rim	0.00035	32.9	n.d.	0.00472	0.253	0.509	639.1	1.29	1.9675	22.52	0.543	3.01	3.42	0.717	15.25	4.74	56.58	20.65	99.87	20.75	201.9	40.40	9050	0.513	76.9	142.6
oc03j08	Core	0.00018	32.9	0.04843	0.00325	n.d.	0.307	649.6	1.28	0.0261	16.57	0.083	1.56	3.41	0.381	15.34	4.95	58.76	21.02	98.95	19.34	171.2	35.04	9518	0.534	88.0	146.0
oc03j10	Core	0.00025	32.9	0.07874	0.00323	0.346	0.936	1739.9	2.13	0.0716	40.81	0.389	5.85	9.05	1.903	37.54	11.90	140.67	55.28	267.19	55.58	540.3	113.44	8755	0.718	150.3	137.6
oc03j11	Rim	0.0006	32.9	n.d.	0.00267	0.252	0.507	776.8	4.83	0.0111	7.42	0.045	0.87	1.92	0.235	12.39	5.10	64.81	26.69	126.37	25.85	237.3	47.50	9557	2.053	58.9	143.4
oc03j12	Core	n.d.	32.9	n.d.	0.00203	n.d.	0.238	405.2	0.69	0.0024	14.31	0.031	0.62	1.34	0.331	7.33	2.60	33.46	13.02	66.73	14.53	145.6	30.59	9248	0.270	30.2	44.0
oc03j13	Core	0.00042	32.9	n.d.	0.00213	n.d.	0.199	363.9	0.55	0.0143	11.41	0.043	0.79	1.89	0.428	9.18	2.77	31.66	12.14	55.87	11.48	114.3	23.79	9532	0.219	26.8	42.5
oc03k07	Rim	0.0003	32.9	n.d.	0.00319	n.d.	0.198	452.8	1.11	0.0047	16.64	0.077	1.27	2.64	0.623	12.33	3.57	40.29	14.58	68.97	14.35	133.5	26.85	8968	0.356	49.7	69.1
oc03k08	Core	n.d.	32.9	n.d.	0.00082	0.266	0.244	381.9	0.82	n.d.	9.76	0.013	0.28	0.69	0.282	4.35	1.73	24.47	11.08	67.09	17.16	204.9	49.30	11674	0.518	33.0	72.1
oc03k09	Core	0.00053	32.9	n.d.	0.00148	0.446	0.280	684.0	1.19	0.0068	11.57	0.076	1.23	2.18	0.877	12.05	4.22	51.41	21.56	110.78	24.15	242.3	52.57	8376	0.473	27.2	61.9
oc03k10	Core	0.00106	32.9	n.d.	0.00145	n.d.	0.069	220.2	0.59	n.d.	7.39	0.025	0.40	0.74	0.311	4.50	1.52	16.68	6.81	35.34	8.08	91.8	20.48	9104	0.138	16.6	43.7
oc03k11	Rim	0.00069	32.9	n.d.	0.00296	0.234	0.212	481.9	1.16	0.0120	21.58	0.110	1.69	2.96	0.795	13.70	3.94	44.23	15.64	72.33	14.98	138.1	28.25	8846	0.378	56.2	70.7
oc03k12	Rim	n.d.	32.9	n.d.	0.00402	0.447	0.321	1516.7	1.33	0.1166	30.74	0.782	10.03	11.67	2.968	49.89	13.45	140.91	50.17	217.17	42.29	380.6	75.10	8847	0.486	162.7	142.5
oc03k13	Core	n.d.	32.9	n.d.	0.00216	0.338	0.283	803.5	2.79	0.0060	14.76	0.095	1.71	3.49	0.455	18.55	6.12	73.35	27.89	128.01	26.38	238.3	45.77	9527	0.814	81.7	66.3
oc03l07	Core	0.00117	32.9	n.d.	0.00194	0.448	0.433	435.8	1.24	0.0520	22.11	0.053	0.78	1.74	0.237	8.14	2.86	35.86	14.13	71.12	15.33	149.2	31.21	10238	0.594	52.9	100.1
oc03l08	Core	0.00017	32.9	n.d.	0.00103	n.d.	0.141	313.1	0.10	0.0236	3.79	0.161	1.98	1.96	1.194	7.55	2.20	25.92	9.76	46.78	11.22	119.5	27.88	7213	0.111	24.2	39.1
oc03l09	Core	0.00061	32.9	0.03617	0.00225	n.d.	0.195	503.4	0.49	0.0043	17.31	0.098	2.13	4.02	1.013	17.43	4.76	50.22	16.70	72.36	14.15	131.4	25.30	8993	0.236	40.0	50.0
oc03l10	Core	n.d.	32.9	n.d.	0.00156	n.d.	0.297	975.5	0.58	0.0084	28.30	0.270	5.39	9.79	2.307	36.10	9.80	97.27	32.67	143.01	28.31	254.2	49.29	9552	0.268	95.9	94.9
oc03l11	Rim	0.00035	32.9	n.d.	0.0017	0.254	0.356	723.7	0.37	0.0069	21.92	0.180	3.50	6.16	1.484	23.56	6.47	69.41	23.30	102.49	21.39	195.4	39.43	9527	0.287	63.4	71.0
oc03l12	Core	0.00081	32.9	n.d.	0.00456	0.351	0.827	805.3	1.02	0.2751	34.01	0.706	7.98	10.20	2.194	32.53	8.33	81.74	26.38	108.83	21.08	191.5	35.63	9078	0.529	134.9	177.1
oc03l13	Core	0.00075	32.9	n.d.	0.00289	0.330	0.321	687.8	0.85	0.0447	18.76	0.160	2.63	4.68	1.118	20.20	5.80	62.96	22.31	101.88	20.81	196.5	38.61	9106	0.366	79.0	84.3
oc03m07	Rim	0.00017	32.9	n.d.	0.00135	n.d.	0.243	330.1	1.17	0.0022	20.27	0.023	0.42	0.90	0.294	5.87	2.13	26.87	10.55	51.97	11.89	119.5	25.60	10747	0.459	62.4	104.5
oc03m08	Core	0.00146	32.9	0.02699	0.00051	n.d.	0.141	126.1	0.13	n.d.	0.46	n.d.	0.06	0.15	0.161	1.38	0.69	9.36	4.06	22.17	5.18	53.4	12.78	8428	0.074	1.3	14.8
oc03m09	Core	0.00214	32.9	n.d.	0.00101	n.d.	0.287	918.4	5.75	0.0095	48.93	0.062	1.45	3.16	1.089	14.45	5.72	72.28	29.11	146.98	33.68	359.3	75.88	10956	1.853	141.0	237.8
oc03m10	Rim	0.00042	32.9	n.d.	0.00115	0.489	0.895	876.3	6.72	0.5201	57.05	0.236	1.90	2.97	0.890	12.80	4.81	61.61	25.55	136.70	32.54	345.0	73.66	10457	2.191	195.0	294.1
oc03m11	Core	0.00039	32.9	n.d.	0.0017	n.d.	0.189	301.3	0.96	0.0010	4.02	0.027	0.47	1.02	0.214	6.19	2.00	26.13	9.91	46.88	9.69	90.6	18.70	8928	0.345	19.4	48.6
oc03m12	Rim	n.d.	32.9	n.d.	0.00215	0.352	0.316	491.8	1.26	0.0697	6.89	0.083	0.99	1.78	0.184	10.11	3.57	42.51	16.60	75.46	15.90	147.7	29.04	9907	0.673	39.6	92.1
oc03m13	Core	0.00118	32.9	n.d.	0.001	0.335	0.263	842.4	0.89	0.0207	16.52	0.178	2.79	4.09	1.571	18.97	6.01	70.55	27.14	134.33	29.65	308.9	70.76	8276	0.283	69.2	80.6
oc03n08	Core	0.00077	32.9	n.d.	0.00197	n.d.	0.378	525.9	0.87	0.0027	19.81	0.057	1.43	2.09	0.481	11.52	3.55	46.36	17.08	80.39	15.73	151.6	31.35	10813	0.529	71.3	116.1
oc03n09	Core	0.00076	32.9	n.d.	0.00129	n.d.	0.248	424.4	0.77	0.0083	12.35	0.056	1.20	1.86	0.788	9.02	2.79	32.95	12.89	65.71	14.71	150.0	33.81	8353	0.233	47.2	85.0
oc03n10	Core	0.00055	32.9	0.02733	0.00143	0.375	0.599	852.1	1.43	1.7718	23.13	1.441	8.93	5.69	1.810	25.25	7.11	79.06	28.01	126.38	25.52	239.8	49.09	8166	0.436	85.5	113.4
oc03n11	Core	0.00204	32.9	n.d.	0.00277	0.364	0.238	584.2	1.26	0.0083	3.76	0.054	1.20	2.65	0.092	13.48	4.43	51.34	19.06	89.26	18.46	169.4	33.40	10695	0.636	54.4	142.4
oc03n12	Rim	0.00875	32.9	n.d.	0.00339	n.d.	0.206	511.7	0.90	0.0066	2.51	0.074	1.29	2.65	0.082	12.16	4.07	45.73	16.78	79.37	16.45	152.7	31.55	9850	0.411	25.4	64.8
oc03n13	Core	n.d.	32.9	n.d.	0.0019	0.250	0.189	377.4	0.85	n.d.	21.04	0.023	0.63	1.72	0.379	8.46	2.70	31.67	12.49	57.88	12.39	122.3	25.08	10136	0.374	29.3	49.4
oc03o07	Core	0.00092	32.9	n.d.	0.00184	0.295	0.234	624.6	0.70	0.0021	12.65	0.091	1.69	2.83	0.684	14.10	4.66	53.98	19.92	97.27	19.47	185.4	39.85	9698	0.224	66.6	112.6
oc03o08	Core	0.00018	32.9	n.d.	0.0031	0.287	0.264	835.9	0.62	0.1281	17.39	0.557	7.70	8.89	3.816	30.08	7.75	79.26	27.32	126.49	25.33	251.3	54.71	7067	0.169	92.4	90.0
oc03o09	Core	0.00405	32.9	n.d.	0.0047	0.343	0.632	1126.6	1.48	0.1148	29.48	0.311	3.59	4.47	2.387	24.94	7.87	93.86	36.06	173.05	36.51	353.4	77.22	6837	0.424	164.4	156.9
oc03o10	Core	0.0014	32.9	n.d.	0.00367	n.d.	0.272	458.2	0.88	0.0030	14.30	0.041	1.24	2.50	0.473	11.85	3.53	39.23	14.61	66.06	12.94	120.2	24.63	9387	0.181	60.6	110.6
oc03o11	Core	0.00261	32.9	n.d.	0.00365	n.d.	0.216	428.7	0.48	0.0036	10.06	0.077	1.49	2.45	0.439	10.86	3.38	38.88	13.62	64.21	13.02	118.7	23.26	9227	0.307	36.1	72.3

Table S3. Element contents (bulk) of sample ZR229, as determined by LA-ICP-MS. Red figures indicate data from two analytical spots on the same grain.

Isotopic mass		Al2O3 27	SiO2 29	CaO 42	TiO2 49	Rb 85	Sr 88	Y 89	Nb 93	La 139	Ce 140	Pr 141	Nd 143	Sm 147	Eu 151	Gd 157	Tb 159	Dy 163	Ho 165	Er 166	Tm 169	Yb 172	Lu 175	Hf 178	Ta 181	Th 232	U 238
Spot ID	Location	wt%	wt%	wt%	wt%	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}
oc03a07	Core	0.00766	32.9	n.d.	0.00148	0.736	0.401	847.9	3.27	0.0043	12.23	0.025	0.71	2.20	0.126	14.22	5.71	75.47	29.42	137.49	28.57	280.8	55.11	10963	1.364	147.2	368.6
oc03a08	Core	0.00086	32.9	n.d.	0.00104	0.280	0.353	1540.6	1.99	0.4007	12.72	0.436	5.54	8.70	0.777	38.03	13.03	152.58	55.03	239.00	46.06	412.3	79.05	8876	0.791	201.3	301.8
oc03a09	Rim	0.00017	32.9	n.d.	0.00055	0.778	0.677	2375.0	17.93	0.3424	20.10	0.171	1.73	4.06	0.169	29.48	13.08	185.74	76.31	384.91	85.19	824.9	158.40	11260	10.763	699.4	2589.2
oc03a10	Rim	0.08084	32.9	0.349	0.00208	7.113	2.004	4649.8	40.28	0.2545	119.37	0.769	9.89	17.00	1.466	85.84	30.96	381.07	147.77	712.41	152.69	1406.3	263.09	9475	11.964	6989.9	5570.1
oc03a11	Rim	0.00022	32.9	0.133	0.0007	0.431	0.596	1054.5	4.16	5.1412	30.56	2.144	10.77	5.65	0.252	21.79	7.56	94.62	36.62	173.55	35.18	322.5	62.19	10397	1.624	271.0	557.5
oc03a12	Core	0.00017	32.9	n.d.	0.00133	0.403	0.296	826.9	1.72	0.0135	10.08	0.059	1.26	2.97	0.261	17.02	6.05	72.87	27.87	129.17	26.21	249.8	48.59	8748	0.677	120.3	233.5
oc03a13	Core	0.00024	32.9	0.028	0.00047	0.518	0.435	1666.7	2.36	0.0086	18.75	0.128	3.23	7.31	0.261	39.16	13.52	157.83	57.36	261.78	51.59	458.7	86.49	10408	0.937	282.1	474.2
oc03b07	Core	0.00359	32.9	0.124	0.00026	1.065	1.049	3010.4	25.27	1.7286	20.97	1.146	6.98	6.26	0.190	35.80	16.85	234.75	98.24	487.84	107.58	1003.8	195.03	12113	15.501	604.4	3361.3
oc03b08	Core	0.03143	32.9	0.071	0.00054	1.354	0.697	2101.0	5.29	3.3734	35.09	1.456	10.13	9.87	0.480	47.73	16.17	194.13	73.28	327.40	63.92	582.8	110.43	9425	1.730	365.9	576.1
oc03b09	Rim	n.d.	32.9	n.d.	0.00148	0.324	0.331	964.7	1.70	0.0025	9.94	0.087	1.75	3.98	0.420	20.32	7.21	85.67	33.12	155.61	31.45	288.2	57.72	8602	0.656	113.3	209.8
oc03b10	Core	0.00141	32.9	n.d.	0.00019	2.415	1.839	6801.8	37.56	2.1083	18.42	0.318	2.43	8.99	0.024	80.13	38.52	549.30	227.55	1114.55	233.05	2083.8	386.43	13551	18.799	1010.0	7723.4
oc03b11	Core	0.0006	32.9	0.026	0.00134	0.553	0.533	2071.6	3.59	0.4228	13.54	0.485	5.69	10.04	1.146	50.71	17.26	198.27	73.55	329.16	63.67	555.1	106.64	8580	1.129	257.2	413.2
oc03b12	Core	0.07957	32.9	0.580	0.00434	12.810	2.790	1286.8	2.47	13.7660	52.95	6.217	31.95	12.89	0.566	35.06	10.55	117.82	42.90	198.92	39.82	357.2	70.94	8473	1.075	180.5	397.1
oc03b13	Core	0.03959	32.9	n.d.	0.00354	8.973	0.443	1749.8	1.41	0.0071	11.36	0.212	4.24	9.61	0.883	47.41	15.29	172.09	61.58	273.97	51.93	452.2	85.50	9026	0.578	177.5	266.3
oc03c07	Core	0.80781	32.9	2.030	0.00392	2.124	62.132	4656.4	41.17	260.934	926.79	116.467	624.14	241.59	4.907	269.63	63.15	572.23	171.45	760.07	151.09	1396.8	290.24	18034	39.032	4187.1	37589.1
oc03c08	Core	0.00109	32.9	0.231	0.00119	0.574	1.143	1758.1	2.46	19.0639	59.59	6.081	28.57	12.21	0.681	44.16	14.02	163.49	60.85	282.17	53.62	477.3	93.06	9148	0.876	220.9	363.9
oc03c09	Core	0.0005	32.9	0.047	0.00101	1.040	0.773	3528.8	3.52	1.0411	25.50	1.209	15.41	24.97	3.174	104.64	32.23	352.89	121.66	535.30	99.81	870.5	163.14	7983	1.024	584.6	599.7
oc03c10	Core	0.03291	32.9	n.d.	0.00128	2.119	0.989	5089.1	7.87	0.3591	52.69	1.092	17.22	31.24	3.316	137.27	43.73	493.68	172.35	744.53	141.71	1223.2	227.07	8591	1.928	1268.9	1067.9
oc03c11	Rim	0.00021	32.9	0.040	0.00139	n.d.	0.312	834.1	2.07	0.0034	10.04	0.067	1.44	3.40	0.314	17.57	6.08	73.51	27.80	130.78	26.50	250.2	49.06	8837	0.808	129.0	259.7
oc03c12	Core	0.13132	32.9	0.274	0.00054	10.550	1.658	2080.1	3.86	5.2048	34.82	2.472	15.48	13.47	1.094	53.84	17.25	200.17	70.52	317.30	62.10	549.1	105.24	8305	1.709	411.5	591.7
oc03c13	Rim	0.00616	32.9	n.d.	0.00155	1.776	1.205	5644.0	8.84	0.0238	9.81	0.318	5.49	16.06	0.705	98.56	40.91	516.90	182.95	839.06	169.11	1518.4	296.39	10167	4.712	839.5	3455.2
oc03d07	Core	0.00513	32.9	0.186	0.00068	0.687	0.894	1112.9	3.96	6.7768	34.55	2.399	12.06	5.73	0.254	23.00	7.95	98.78	37.88	180.73	36.68	331.1	66.23	10337	1.581	239.3	483.4
oc03d08	Rim	0.00549	32.9	0.033	0.00029	0.781	1.008	1908.2	23.88	1.1111	17.40	0.598	2.90	3.99	0.060	24.89	11.49	162.31	64.75	320.76	69.29	640.5	124.61	11942	12.237	713.4	2420.9
oc03d09	Core	0.00015	32.9	n.d.	0.00061	0.447	0.494	1765.5	2.13	0.0183	12.17	0.278	5.06	9.38	0.906	43.75	14.47	167.39	61.20	272.33	52.85	476.8	93.54	9088	0.859	224.1	350.0
oc03d10	Core	0.00044	32.9	n.d.	0.00061	n.d.	0.450	540.7	4.15	0.0043	6.05	0.017	0.29	0.97	0.059	7.37	3.19	44.42	18.57	94.38	19.92	190.0	39.28	11592	2.126	96.8	362.7
oc03d11	Core	0.16686	32.9	0.334	0.00526	9.458	1.477	2984.2	7.21	5.5802	57.74	3.736	25.70	20.99	1.305	76.46	24.77	277.87	103.42	467.52	94.14	823.3	158.75	8645	2.235	1258.1	1057.1
oc03d12	Core	0.04899	32.9	0.582	0.00161	5.573	1.786	3535.7	20.34	8.4657	52.96	5.868	32.30	17.79	0.440	59.60	22.54	291.37	113.37	553.46	118.70	1082.9	208.60	11428	10.264	1567.0	3540.5
oc03d13	Rim	0.00086	32.9	0.164	0.00064	0.905	0.970	2591.6	14.71	6.5349	40.01	3.229	16.44	9.70	0.603	39.57	15.10	199.63	80.31	401.38	87.22	845.8	165.99	10595	7.745	752.3	2395.3
oc03e07	Core	0.05518	32.9	0.201	0.00187	1.904	1.120	1981.4	2.86	3.0069	22.59	1.489	10.11	10.46	1.873	45.31	15.14	175.67	65.14	309.77	62.71	591.1	121.09	8320	1.089	430.7	740.4
oc03e08	Core	0.01246	32.9	0.228	0.00126	1.487	1.015	4045.6	17.76	4.8111	92.29	3.001	19.94	20.97	0.988	97.15	32.64	380.79	137.43	609.94	117.71	1016.8	191.35	8442	4.996	2227.6	2284.7
oc03e09	Core	0.71821	32.9	0.044	0.00275	14.991	1.217	1621.2	6.92	1.4192	23.80	0.741	6.26	8.05	0.506	36.63	12.10	145.98	53.96	256.57	49.91	450.6	88.13	9158	3.031	358.8	678.7
oc03e10	Core	0.02049	32.9	0.040	0.00258	0.595	0.528	1200.6	3.29	0.0938	11.58	0.145	2.28	4.85	0.482	24.85	8.95	108.45	41.39	195.71	39.71	361.5	74.00	7985	0.868	189.9	286.0
oc03e11	Core	0.00014	32.9	0.054	0.00056	0.704	0.670	2473.8	6.29	2.9238	24.62	1.512	9.00	9.11	0.379	44.05	17.03	210.38	82.74	394.11	78.52	712.3	136.37	10766	3.250	534.0	1392.9
oc03e12	Core	0.00544	32.9	0.047	0.00046	2.158	2.027	5885.6	99.47	0.1177	21.18	0.281	2.89	8.07	0.285	71.11	34.56	498.42	205.16	1018.49	204.91	1806.5	343.72	15434	32.079	742.5	8056.9
oc03e13	Core	0.03444	32.9	0.058	0.00192	2.032	3.857	3385.9	37.54	0.3895	11.19	0.495	3.44	4.20	0.562	31.38	15.53	236.05	113.06	654.00	156.30	1512.5	310.78	17004	20.230	530.3	5752.8
oc03f07	Rim	n.d.	32.9	0.079	0.00067	n.d.	0.397	969.6	2.88	0.8102	16.05	0.441	3.06	4.04	0.367	19.24	6.97	84.83	32.27	155.30	31.57	292.9	60.09	9153	0.989	171.4	308.1
oc03f08	Core	0.18248	32.9	0.049	0.0043	3.691	1.134	1504.4	1.44	0.9138	9.30	0.430	4.78	7.83	0.868	38.18	12.39	144.47	52.81	240.98	45.71	403.6	78.07	8250	0.447	139.5	225.5
oc03f09	Rim	0.01724	32.9	n.d.	0.0012	1.964	0.577	1123.7	5.96	0.0391	16.24	0.076	1.34	3.24	0.153	19.49	7.28	95.20	37.26	190.64	40.19	376.1	78.32	11166	3.060	291.7	906.2
oc03f10	Rim	0.14926	32.9	0.647	0.00056	5.376	1.747	1827.1	15.72	17.2310	74.78	7.917	40.72	16.06	0.376	41.65	13.49	159.80	60.61	293.04	60.65	540.0	104.72	11197	7.497	649.3	1517.8
oc03f11	Rim	0.07207	32.9	0.048	0.00439	16.420	1.523	5860.2	25.48	0.2251	25.52	0.448	6.38	16.59	0.319	99.31	39.44	502.97	189.57	886.08	184.15	1612.4	298.44	10270	11.767	2002.6	5108.7
oc03f12	Core	0.01462	32.9	n.d.	0.00111	0.839	0.480	2018.1	10.85	0.0201	8.60	0.103	2.07	6.21	0.262	40.61	15.12	175.65	64.26	306.21	63.57	583.2	115.12	11441	6.374	420.7	1586.4
oc03f13	Rim	0.00046	32.9	n.d.	0.00045	0.376	0.477	1270.7	10.89	0.0097	10.10	0.019	0.56	2.39	0.066	16.14	7.17	100.98	41.52	212.29	45.48	425.7	83.38	11541	6.418	312.3	1287.9
oc03g07	Core	0.00592	32.9	n.d.	0.00088	0.374	0.420	776.1	1.79	0.0396	13.88	0.087	1.20	2.29	1.140	11.80	3.95	52.21	23.14	129.22	32.39	362.0	88.89	10308	0.915	159.4	244.7
oc03g08	Rim	0.00045	32.9	n.d.	0.00137	0.241	0.464	1356.3	3.76	0.8932	23.66	0.476	4.36	6.39	0.500	31.53	10.71	124.43	45.89	211.81	40.61	366.1	70.33	8245	1.059	449.0	458.3
oc03g09	Core	0.77146	32.9	0.413	0.00119	34.879	2.257	796.6	4.78	49.2263	147.46	19.046	89.39	24.08	0.438	32.49	7.04	71.19	27.11	135.79	29.25	286.0	63.01	8559	2.308	285.7	914.3
oc03g10	Core	n.d.	32.9	0.299	0.00024	0.488	1.279	2500.0	11.35	8.9813	42.70	4.465	22.48	10.42	0.198	38.04	15.00	200.00	80.48	393.98	84.65	787.5	153.98	11690	7.106	605.8	2233.6
oc03g11	Rim	0.00074	32.9	0.394	0.00046	0.646	1.162	2386.8	16.59	11.9005	55.00	6.610	33.49	15.09	0.235	42.55	15.41	197.55	75.75	375.64	77.38	711.5	136.48	11260	8.211	598.4	2076.6
oc03g12	Rim	0.01363	32.9	0.074	0.00048	1.299	1.022	2828.5	20.33	3.7178	28.99	1.878	9.83	6.92	0.116	36.34	16.16	216.95	90.38	440.33	95.35	870.2	167.54	11904	12.737	768.3	2880.7
oc03g13	Rim	0.01475	32.9	0.034	0.00475	2.223	0.995	2615.9	28.93	0.9139	20.45	0.660	4.34	5.23	0.098	31.79	14.55	199.21	82.44	423.82	92.69	883.4	172.82	12350	17.379	1435.8	3819.2

Table S4. Element contents (bulk) of sample Can1, as determined by LA-ICP-MS. Red figures indicate data from two analytical spots on the same grain.

Isotopic mass	Location	Al2O3 27	SiO2 29	CaO 42	TiO2 49	Rb 85	Sr 88	Y 89	Nb 93	La 139	Ce 140	Pr 141	Nd 143	Sm 147	Eu 151	Gd 157	Tb 159	Dy 163	Ho 165	Er 166	Tm 169	Yb 172	Lu 175	Hf 178	Ta 181	Th 232	U 238
Spot ID		wt%	wt%	wt%	wt%	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}	µg g^{-1}
oc03h07	Rim	0.01023	32.9	0.024	0.00344	0.438	0.390	1422.6	0.73	0.0052	1.98	0.147	2.76	6.53	0.129	35.20	11.36	129.38	48.33	219.80	42.46	382.2	76.48	10012	0.296	53.4	97.0
oc03h08	Core	n.d.	32.9	n.d.	0.00165	0.425	0.271	1010.8	0.37	0.0087	6.78	0.170	3.52	6.31	1.461	27.67	8.76	96.38	33.81	144.55	29.07	247.4	48.05	8505	0.127	78.3	93.0
oc03h09	Core	0.00014	32.9	n.d.	0.00093	0.231	0.309	1071.1	10.52	0.7907	22.04	0.812	6.35	7.04	1.246	29.89	9.91	111.46	39.53	162.78	30.25	247.5	44.59	6970	3.151	64.5	142.8
oc03h10	Core	0.00142	32.9	n.d.	0.00446	n.d.	0.233	490.6	1.45	0.0082	7.59	0.090	1.30	2.29	0.367	12.40	3.94	46.36	17.15	74.41	14.64	132.6	25.67	8726	0.391	25.6	29.4
oc03h11	Core	0.02434	32.9	0.027	0.00436	0.953	0.641	824.7	0.64	0.0220	1.76	0.222	3.68	5.86	0.631	27.03	7.55	80.74	28.63	120.96	24.21	212.7	44.25	9315	0.179	22.3	35.4
oc03h12	Core	0.00019	32.9	n.d.	0.00264	1.019	0.583	3018.5	1.01	0.0123	2.71	0.194	3.56	8.77	2.247	64.45	22.71	274.74	104.17	459.18	86.66	748.9	139.38	8515	0.532	78.6	121.3
oc03h13	Core	0.00033	32.9	n.d.	0.00461	n.d.	0.347	1200.3	1.44	0.3525	28.42	0.455	6.07	7.63	2.205	33.36	9.96	110.48	41.23	190.73	37.21	347.6	71.99	7184	0.483	73.2	73.5
oc03i07	Rim	n.d.	32.9	n.d.	0.00324	n.d.	0.311	640.0	1.02	0.0055	21.06	0.071	1.31	2.81	0.921	14.04	4.47	53.75	21.21	98.73	21.06	200.2	41.68	8399	0.354	38.3	44.9
oc03i08	Core	0.00045	32.9	n.d.	0.00359	n.d.	0.202	580.8	1.86	0.0025	12.75	0.046	0.73	1.72	0.275	10.43	3.70	48.49	18.95	90.15	19.15	178.0	35.62	9488	0.676	51.3	93.4
oc03i09	Core	0.00486	32.9	n.d.	0.00169	0.293	0.281	676.6	0.76	0.0631	7.94	0.208	3.60	5.05	0.317	20.84	6.45	66.77	23.20	97.41	18.81	167.0	31.46	10175	0.294	118.3	118.4
oc03i10	Core	0.00133	32.9	n.d.	0.00454	0.454	0.403	1147.4	1.06	0.6194	20.13	0.617	5.32	6.84	2.270	29.23	9.47	110.64	40.48	188.52	37.62	344.7	67.18	8356	0.362	90.2	68.7
oc03i11	Core	0.00104	32.9	0.026	0.00196	0.322	0.266	685.9	1.20	0.0034	18.84	0.116	2.13	3.74	0.565	16.64	4.87	58.38	21.94	100.88	20.55	194.2	38.84	10834	0.606	63.1	136.5
oc03i12	Core	0.00014	32.9	0.048	0.00176	0.320	0.252	900.7	4.72	0.0520	8.40	0.099	1.29	2.43	0.272	15.47	5.95	75.60	30.05	144.82	29.83	263.2	52.61	9492	2.039	67.6	155.9
oc03j07	Rim	0.00035	32.9	n.d.	0.00472	0.253	0.509	639.1	1.29	1.9675	22.52	0.543	3.01	3.42	0.717	15.25	4.74	56.58	20.65	99.87	20.75	201.9	40.40	9050	0.513	76.9	142.6
oc03j08	Core	0.00018	32.9	0.048	0.00325	n.d.	0.307	649.6	1.28	0.0261	16.57	0.083	1.56	3.41	0.381	15.34	4.95	58.76	21.02	98.95	19.34	171.2	35.04	9518	0.534	88.0	146.0
oc03j10	Core	0.00025	32.9	0.079	0.00323	0.346	0.936	1739.9	2.13	0.0716	40.81	0.389	5.85	9.05	1.903	37.54	11.90	140.67	55.28	267.19	55.58	540.3	113.44	8755	0.718	150.3	137.6
oc03j11	Rim	0.0006	32.9	n.d.	0.00267	0.252	0.507	776.8	4.83	0.0111	7.42	0.045	0.87	1.92	0.235	12.39	5.10	64.81	26.69	126.37	25.85	237.3	47.50	9557	2.053	58.9	143.4
oc03j12	Core	n.d.	32.9	n.d.	0.00203	n.d.	0.238	405.2	0.69	0.0024	14.31	0.031	0.62	1.34	0.331	7.33	2.60	33.46	13.02	66.73	14.53	145.6	30.59	9248	0.270	30.2	44.0
oc03j13	Core	0.00048	32.9	n.d.	0.00208	n.d.	0.189	360.7	0.53	0.0185	11.19	0.041	0.76	1.74	0.422	8.71	2.71	30.72	12.01	54.63	11.39	113.4	23.26	9389	0.222	26.7	42.4
oc03k07	Rim	0.0003	32.9	n.d.	0.00319	n.d.	0.198	452.8	1.11	0.0047	16.64	0.077	1.27	2.64	0.623	12.33	3.57	40.29	14.58	68.97	14.35	133.5	26.85	8968	0.356	49.7	69.1
oc03k08	Core	n.d.	32.9	n.d.	0.00082	0.266	0.244	381.9	0.82	n.d.	9.76	0.013	0.28	0.69	0.282	4.35	1.73	24.47	11.08	67.09	17.16	204.9	49.30	11674	0.518	33.0	72.1
oc03k09	Core	0.00053	32.9	n.d.	0.00148	0.446	0.280	684.0	1.19	0.0068	11.57	0.076	1.23	2.18	0.877	12.05	4.22	51.41	21.56	110.78	24.15	242.3	52.57	8376	0.473	27.2	61.9
oc03k10	Core	0.00103	32.9	0.092	0.00123	n.d.	0.793	211.3	0.44	1.2997	9.58	0.346	1.47	0.86	0.356	4.33	1.40	15.69	6.49	33.95	7.78	83.9	19.14	9158	0.232	15.9	41.7
oc03k11	Rim	0.00069	32.9	n.d.	0.00296	0.234	0.212	481.9	1.16	0.0120	21.58	0.110	1.69	2.96	0.795	13.70	3.94	44.23	15.64	72.33	14.98	138.1	28.25	8846	0.378	56.2	70.7
oc03k12	Rim	0.00015	32.9	n.d.	0.00343	0.415	0.345	1310.9	1.08	0.4754	28.86	0.878	9.39	11.02	2.613	41.47	11.70	124.44	43.13	190.52	37.42	328.2	64.98	8163	0.455	145.7	128.9
oc03k13	Core	n.d.	32.9	n.d.	0.00216	0.338	0.283	803.5	2.79	0.0060	14.76	0.095	1.71	3.49	0.455	18.55	6.12	73.35	27.89	128.01	26.38	238.3	45.77	9527	0.814	81.7	66.3
oc03l07	Core	0.00117	32.9	n.d.	0.00194	0.448	0.433	435.8	1.24	0.0520	22.11	0.053	0.78	1.74	0.237	8.14	2.86	35.86	14.13	71.12	15.33	149.2	31.21	10238	0.594	52.9	100.1
oc03l08	Core	0.00017	32.9	n.d.	0.00103	n.d.	0.141	313.1	0.10	0.0236	3.79	0.161	1.98	1.96	1.194	7.55	2.20	25.92	9.76	46.78	11.22	119.5	27.88	7213	0.111	24.2	39.1
oc03l09	Core	0.00061	32.9	0.036	0.00225	n.d.	0.195	503.4	0.49	0.0043	17.31	0.098	2.13	4.02	1.013	17.43	4.76	50.22	16.70	72.36	14.15	131.4	25.30	8993	0.236	40.0	50.0
oc03l10	Core	n.d.	32.9	n.d.	0.00156	n.d.	0.297	975.5	0.58	0.0084	28.30	0.270	5.39	9.79	2.307	36.10	9.80	97.27	32.67	143.01	28.31	254.2	49.29	9552	0.268	95.9	94.9
oc03l11	Rim	0.00043	32.9	n.d.	0.00167	0.231	0.320	690.5	0.46	0.0072	20.62	0.172	3.34	5.75	1.370	22.21	6.16	66.13	22.16	98.65	20.44	186.6	37.69	9073	0.265	60.0	68.9
oc03l12	Core	0.00081	32.9	n.d.	0.00456	0.351	0.827	805.3	1.02	0.2751	34.01	0.706	7.98	10.20	2.194	32.53	8.33	81.74	26.38	108.83	21.08	191.5	35.63	9078	0.529	134.9	177.1
oc03l13	Core	0.00075	32.9	n.d.	0.00289	0.330	0.321	687.8	0.85	0.0447	18.76	0.160	2.63	4.68	1.118	20.20	5.80	62.96	22.31	101.88	20.81	196.5	38.61	9106	0.366	79.0	84.3
oc03m07	Rim	0.00017	32.9	n.d.	0.00135	n.d.	0.243	330.1	1.17	0.0022	20.27	0.023	0.42	0.90	0.294	5.87	2.13	26.87	10.55	51.97	11.89	119.5	25.60	10747	0.459	62.4	104.5
oc03m08	Core	0.00146	32.9	0.027	0.00051	n.d.	0.141	126.1	0.13	n.d.	0.46	n.d.	0.06	0.15	0.161	1.38	0.69	9.36	4.06	22.17	5.18	53.4	12.78	8428	0.074	1.3	14.8
oc03m09	Core	0.00234	32.9	0.027	0.00195	0.632	0.707	1698.7	11.66	0.1070	80.01	0.365	4.36	8.26	2.831	36.80	12.81	159.00	56.50	269.29	56.65	528.0	98.34	9459	2.679	403.7	292.7
oc03m10	Rim	0.00172	32.9	n.d.	0.00118	0.353	0.902	852.1	6.92	0.4470	56.61	0.223	1.82	2.92	0.881	12.78	4.77	61.10	25.20	132.32	31.38	328.2	69.60	10291	2.168	187.7	285.3
oc03m11	Core	0.00039	32.9	n.d.	0.0017	n.d.	0.189	301.3	0.96	0.0010	4.02	0.027	0.47	1.02	0.214	6.19	2.00	26.13	9.91	46.88	9.69	90.6	18.70	8928	0.345	19.4	48.6
oc03m12	Rim	0.00022	32.9	n.d.	0.00174	0.268	0.326	489.9	1.65	0.1741	6.70	0.137	1.50	1.93	0.267	10.25	3.48	41.93	15.91	74.41	15.53	143.2	28.07	9200	0.701	40.2	90.6
oc03m13	Core	0.00118	32.9	n.d.	0.001	0.335	0.263	842.4	0.89	0.0207	16.52	0.178	2.79	4.09	1.571	18.97	6.01	70.55	27.14	134.33	29.65	308.9	70.76	8276	0.283	69.2	80.6
oc03n08	Core	0.01868	32.9	3.639	0.00243	0.301	34.088	530.9	0.87	76.485	204.50	25.552	122.58	23.30	2.335	28.29	5.85	52.80	17.71	79.18	15.26	145.8	28.98	9861	0.474	65.9	102.5
oc03n09	Core	0.00076	32.9	n.d.	0.00129	n.d.	0.248	424.4	0.77	0.0083	12.35	0.056	1.20	1.86	0.788	9.02	2.79	32.95	12.89	65.71	14.71	150.0	33.81	8353	0.233	47.2	85.0
oc03n10	Core	0.00055	32.9	0.027	0.00143	0.375	0.599	852.1	1.43	1.7718	23.13	1.441	8.93	5.69	1.810	25.25	7.11	79.06	28.01	126.38	25.52	239.8	49.09	8166	0.436	85.5	113.4
oc03n11	Core	0.00183	32.9	n.d.	0.00194	0.264	0.269	560.6	1.15	0.0241	3.75	0.058	1.28	2.40	0.078	13.12	4.18	49.66	18.15	85.82	18.02	165.4	32.58	10354	0.594	53.3	137.7
oc03n12	Rim	0.00875	32.9	n.d.	0.00339	n.d.	0.206	511.7	0.90	0.0066	2.51	0.074	1.29	2.65	0.082	12.16	4.07	45.73	16.78	79.37	16.45	152.7	31.55	9850	0.411	25.4	64.8
oc03n13	Core	n.d.	32.9	n.d.	0.0019	0.250	0.189	377.4	0.85	n.d.	21.04	0.023	0.63	1.72	0.379	8.46	2.70	31.67	12.49	57.88	12.39	122.3	25.08	10136	0.374	29.3	49.4
oc03o07	Core	0.00067	32.9	n.d.	0.00199	n.d.	0.239	500.2	0.71	0.0011	10.61	0.061	1.16	2.09	0.519	10.82	3.57	41.97	15.81	77.76	15.95	151.2	32.41	9324	0.259	50.9	91.8
oc03o08	Core	0.00018	32.9	n.d.	0.0031	0.287	0.264	835.9	0.62	0.1281	17.39	0.557	7.70	8.89	3.816	30.08	7.75	79.26	27.32	126.49	25.33	251.3	54.71	7067	0.169	92.4	90.0
oc03o09	Core	0.00405	32.9	n.d.	0.0047	0.343	0.632	1126.6	1.48	0.1148	29.48	0.311	3.59	4.47	2.387	24.94	7.87	93.86	36.06	173.05	36.51	353.4	77.22	6837	0.424	164.4	156.9
oc03o10	Core	0.00123	32.9	0.029	0.00342	n.d.	0.199	438.6	0.83	0.0312	13.94	0.078	1.18	2.37	0.472	11.68	3.44	38.99	14.10	64.33	12.73	114.7	23.60	9099	0.233	58.9	105.9
oc03o11	Core	0.00261	32.9	n.d.	0.00365	n.d.	0.216	428.7	0.48	0.0036	10.06	0.077	1.49	2.45	0.439	10.86	3.38	38.88	13.62	64.21	13.02	118.7	23.26	9227	0.307	36.1	72.3

Table S5. Results of OSL decay curve decomposition into up to three components. For further details, see main text.

ZR229				ZR229-PH				Can1			
Hole #	Comp. 1 [cm^2]	Comp. 2 [cm^2]	Comp. 3 [cm^2]	Hole #	Comp. 1 [cm^2]	Comp. 2 [cm^2]	Comp. 3 [cm^2]	Hole #	Comp. 1 [cm^2]	Comp. 2 [cm^2]	Comp. 3 [cm^2]
1	3.19E-19	1.23E-21	NA	1	NA	NA	NA	1	1.25E-19	8.01E-21	NA
2	7.86E-21	NA	NA	2	1.58E-19	7.15E-21	NA	2	1.68E-19	NA	NA
3	6.64E-20	2.64E-21	NA	3	4.58E-21	NA	NA	3	1.24E-19	2.55E-21	NA
4	2.96E-19	1.77E-21	NA	4	1.96E-19	5.40E-20	6.20E-21	4	6.70E-20	3.67E-21	NA
5	NA	NA	NA	5	8.90E-20	8.93E-21	NA	5	8.37E-20	1.59E-21	NA
6	1.32E-19	1.36E-21	NA	6	9.85E-21	NA	NA	6	3.19E-21	NA	NA
7	NA	NA	NA	7	1.70E-19	4.87E-21	NA	7	2.48E-19	5.84E-21	NA
8	5.24E-22	NA	NA	8	2.74E-20	NA	NA	8	1.70E-19	6.39E-21	NA
9	1.72E-19	5.68E-21	NA	9	2.14E-19	7.15E-21	NA	9	1.46E-19	3.32E-21	NA
10	1.15E-21	NA	NA	10	1.00E-19	4.75E-21	NA	10	9.93E-20	2.05E-21	NA
11	1.77E-19	3.88E-21	NA	11	6.98E-21	NA	NA	11	2.40E-22	NA	NA
12	1.64E-19	7.52E-21	NA	12	1.12E-19	1.16E-20	NA	12	9.19E-21	NA	NA
13	2.65E-19	4.75E-20	3.53E-21	13	1.18E-20	NA	NA	13	5.86E-21	NA	NA
14	9.82E-20	2.43E-21	NA	14	1.88E-19	9.15E-21	NA	14	1.98E-19	1.10E-20	NA
15	2.63E-19	8.42E-21	NA	15	1.95E-19	5.75E-21	NA	15	4.84E-21	NA	NA
16	1.38E-19	6.84E-21	NA	16	1.40E-19	1.06E-20	NA	16	1.80E-19	1.05E-20	NA
17	9.80E-20	3.94E-21	NA	17	1.20E-19	4.17E-21	NA	17	1.27E-19	1.07E-20	NA
18	1.45E-19	3.73E-21	NA	18	7.94E-20	1.35E-21	NA	18	2.44E-19	2.52E-20	1.31E-21
19	6.57E-21	NA	NA	19	3.00E-20	7.14E-21	NA	19	1.97E-19	4.57E-21	NA
20	6.29E-21	NA	NA	20	1.47E-19	7.81E-21	NA	20	5.19E-20	5.06E-22	NA
21	8.55E-20	NA	NA	21	NA	NA	NA	21	4.12E-21	NA	NA
22	5.24E-21	NA	NA	22	7.26E-20	NA	NA	22	1.02E-19	5.11E-21	NA
23	1.20E-19	1.51E-21	NA	23	1.51E-19	6.10E-21	NA	23	7.09E-20	2.02E-20	3.68E-21
24	2.17E-19	1.69E-21	NA	24	8.77E-20	4.88E-21	NA	24	1.05E-19	5.23E-21	NA
25	1.74E-19	4.12E-21	NA	25	2.06E-19	1.03E-20	NA	25	2.37E-19	1.14E-20	NA
26	1.17E-19	2.29E-21	NA	26	2.29E-19	9.26E-21	NA	26	1.48E-19	5.61E-21	NA
27	1.62E-19	3.68E-21	NA	27	9.28E-20	NA	NA	27	1.28E-19	6.83E-21	NA
28	1.64E-19	4.42E-21	NA	28	1.26E-19	4.77E-21	NA	28	1.57E-19	9.07E-21	NA
29	2.61E-21	NA	NA	29	3.66E-21	NA	NA	29	1.28E-19	4.45E-21	NA
30	NA	NA	NA	30	1.31E-19	7.45E-21	NA	30	2.86E-19	5.94E-21	NA
31	2.19E-19	4.90E-21	NA	31	1.46E-19	8.93E-21	NA	31	4.47E-20	NA	NA
32	1.59E-19	2.41E-21	NA	32	3.71E-20	NA	NA	32	1.30E-20	NA	NA
33	1.91E-19	2.10E-21	NA	33	1.58E-19	1.11E-20	NA	33	1.89E-19	4.13E-20	4.63E-21
34	1.77E-20	NA	NA	34	2.95E-20	NA	NA	34	6.75E-20	4.50E-21	NA
35	2.42E-19	5.13E-20	5.47E-21	35	1.93E-19	1.11E-20	NA	35	3.12E-21	NA	NA
36	NA	NA	NA	36	9.85E-20	5.65E-21	NA	36	2.05E-19	3.30E-20	1.31E-21
37	2.49E-19	NA	NA	37	6.40E-20	8.19E-21	NA	37	2.60E-20	2.50E-21	NA
38	1.84E-19	5.97E-21	NA	38	4.59E-22	NA	NA	38	3.28E-20	NA	NA
39	1.37E-19	2.38E-21	NA	39	3.72E-21	NA	NA	39	1.58E-19	1.98E-20	1.80E-21
40	1.32E-21	NA	NA	40	1.62E-19	3.32E-20	6.09E-21	40	2.50E-19	9.89E-21	NA
41	1.19E-19	NA	NA	41	1.22E-21	NA	NA	41	1.54E-19	1.29E-20	7.70E-22
42	1.40E-19	4.15E-20	6.80E-21	42	2.11E-19	7.35E-21	NA	42	1.07E-19	5.68E-21	NA
43	1.65E-19	4.03E-21	NA	43	2.29E-19	1.38E-20	NA	43	1.56E-19	2.73E-21	NA
44	9.30E-20	5.53E-21	NA	44	2.11E-19	1.21E-20	NA	44	2.28E-19	4.25E-21	NA
45	5.89E-20	NA	NA	45	2.56E-20	6.76E-21	NA	45	1.14E-19	8.95E-21	NA
46	2.61E-19	9.99E-21	NA	46	1.48E-19	6.60E-21	NA	46	1.07E-19	6.77E-21	NA
47	1.76E-19	1.97E-21	NA	47	9.86E-20	5.14E-21	NA	47	3.15E-21	NA	NA
48	1.66E-19	4.38E-21	NA	48	6.37E-21	NA	NA	48	3.83E-20	NA	NA
49	1.69E-19	1.19E-20	NA	49	2.31E-19	7.08E-21	NA	49	7.96E-20	1.58E-21	NA
50	1.57E-19	4.58E-21	NA	50	1.67E-19	7.29E-21	NA	50	8.37E-20	3.95E-21	NA
51	1.60E-19	8.02E-21	NA	51	1.53E-19	8.62E-21	NA	51	1.47E-19	3.34E-21	NA
52	2.98E-20	NA	NA	52	1.32E-19	5.51E-21	NA	52	2.59E-19	2.11E-21	NA
53	2.87E-19	8.12E-21	NA	53	6.30E-21	NA	NA	53	1.08E-19	2.32E-20	2.38E-21
54	1.39E-19	3.44E-21	NA	54	2.12E-19	4.18E-20	6.04E-21	54	1.18E-19	6.83E-21	NA
55	4.48E-20	NA	NA	55	9.09E-20	6.99E-21	NA	55	7.64E-20	4.82E-21	NA
56	2.83E-20	NA	NA	56	8.14E-20	1.78E-21	NA	56	2.20E-19	3.23E-20	1.68E-21
57	5.50E-20	NA	NA	57	1.14E-19	4.74E-21	NA	57	5.95E-20	2.69E-21	NA
58	1.41E-19	4.25E-21	NA	58	8.52E-21	NA	NA	58	6.65E-20	5.57E-21	NA
59	2.96E-21	NA	NA	59	5.83E-20	NA	NA	59	2.81E-20	NA	NA
60	NA	NA	NA	60	3.00E-19	1.25E-20	NA	60	2.73E-20	2.63E-21	NA
61	1.44E-19	2.19E-21	NA	61	5.29E-21	NA	NA	61	3.72E-21	NA	NA
62	NA	NA	NA	62	1.78E-20	NA	NA	62	1.24E-19	2.77E-20	5.21E-21
63	1.24E-19	4.27E-21	NA	63	1.78E-19	1.73E-20	2.82E-21	63	2.49E-19	4.06E-20	3.63E-21
64	5.18E-20	NA	NA	64	5.18E-20	3.37E-21	NA	64	3.88E-21	NA	NA
65	2.84E-19	4.82E-20	4.42E-21	65	2.69E-19	8.01E-21	NA	65	4.72E-20	1.36E-21	NA
66	2.07E-19	3.30E-21	NA	66	6.15E-20	5.14E-21	NA	66	2.16E-19	1.34E-20	NA
67	1.34E-19	5.17E-21	NA	67	2.05E-19	4.50E-21	NA	67	9.75E-20	6.75E-21	NA
68	6.22E-20	NA	NA	68	8.08E-20	7.35E-21	NA	68	1.32E-19	3.02E-21	NA
69	4.39E-20	NA	NA	69	1.87E-19	6.49E-21	NA	69	1.00E-19	4.44E-21	NA
70	1.72E-19	7.93E-21	NA	70	1.79E-19	3.08E-20	4.19E-21	70	1.76E-19	9.38E-21	NA
71	2.14E-19	7.73E-21	NA	71	1.43E-19	6.17E-21	NA	71	3.06E-20	NA	NA

72	1.91E-19	6.80E-21	NA	72	2.50E-20	NA	NA	72	1.15E-20	NA	NA
73	6.19E-20	NA	NA	73	1.64E-19	3.26E-20	6.42E-21	73	2.22E-19	5.70E-21	NA
74	1.46E-19	6.03E-21	NA	74	1.54E-19	8.61E-21	NA	74	1.68E-19	2.73E-20	3.59E-21
75	8.32E-20	3.44E-21	NA	75	6.25E-21	NA	NA	75	7.90E-20	6.14E-21	NA
76	1.56E-19	5.70E-21	NA	76	1.56E-19	1.05E-20	NA	76	1.49E-19	5.27E-21	NA
77	5.94E-21	NA	NA	77	8.72E-20	6.48E-21	NA	77	1.75E-19	1.22E-20	NA
78	2.49E-19	4.93E-21	NA	78	4.97E-21	NA	NA	78	9.61E-20	1.01E-20	NA
79	8.47E-20	3.50E-21	NA	79	1.65E-20	NA	NA	79	2.81E-19	4.79E-21	NA
80	1.78E-19	5.93E-21	NA	80	1.68E-19	4.73E-21	NA	80	6.92E-20	NA	NA
81	2.84E-21	NA	NA	81	1.54E-19	5.60E-21	NA	81	1.11E-19	2.54E-20	1.60E-21
82	1.94E-19	1.27E-20	NA	82	1.83E-21	NA	NA	82	1.31E-19	2.17E-21	NA
83	2.33E-19	1.20E-20	NA	83	2.25E-20	NA	NA	83	2.63E-19	4.88E-21	NA
84	1.49E-19	7.30E-21	NA	84	1.49E-19	8.68E-21	NA	84	8.27E-20	3.49E-21	NA
85	1.93E-19	6.70E-21	NA	85	1.26E-19	7.74E-21	NA	85	7.42E-20	1.76E-21	NA
86	2.30E-19	9.70E-21	NA	86	8.79E-20	NA	NA	86	2.15E-20	NA	NA
87	9.79E-20	5.43E-21	NA	87	NA	NA	NA	87	2.92E-21	NA	NA
88	2.71E-19	3.70E-20	4.82E-21	88	9.41E-20	1.93E-21	NA	88	1.19E-19	2.31E-21	NA
89	3.78E-20	NA	NA	89	1.37E-19	1.02E-20	NA	89	1.14E-20	NA	NA
90	1.08E-19	4.36E-21	NA	90	7.11E-20	NA	NA	90	6.68E-21	NA	NA
91	1.43E-19	4.13E-21	NA	91	7.34E-21	NA	NA	91	5.22E-20	NA	NA
92	1.05E-19	1.71E-21	NA	92	3.04E-20	NA	NA	92	2.02E-19	5.98E-21	NA
93	1.57E-19	7.97E-21	NA	93	3.69E-20	NA	NA	93	6.33E-20	6.68E-21	NA
94	1.82E-19	3.84E-21	NA	94	3.00E-20	NA	NA	94	5.36E-20	NA	NA
95	9.09E-20	NA	NA	95	2.16E-19	2.59E-20	3.46E-21	95	1.35E-19	3.56E-20	4.87E-21
96	2.73E-19	3.32E-21	NA	96	1.32E-19	3.97E-21	NA	96	1.08E-19	6.87E-21	NA
97	1.20E-19	7.15E-21	NA	97	2.11E-19	5.59E-21	NA	97	3.66E-20	2.39E-21	NA
98	8.27E-20	NA	NA	98	1.94E-20	NA	NA	98	2.50E-19	1.31E-20	NA
99	2.09E-19	3.52E-20	2.39E-21	99	1.37E-19	8.29E-21	NA	99	1.72E-19	1.14E-20	NA
100	NA	NA	NA	100	3.49E-20	NA	NA	100	9.67E-20	7.63E-21	NA

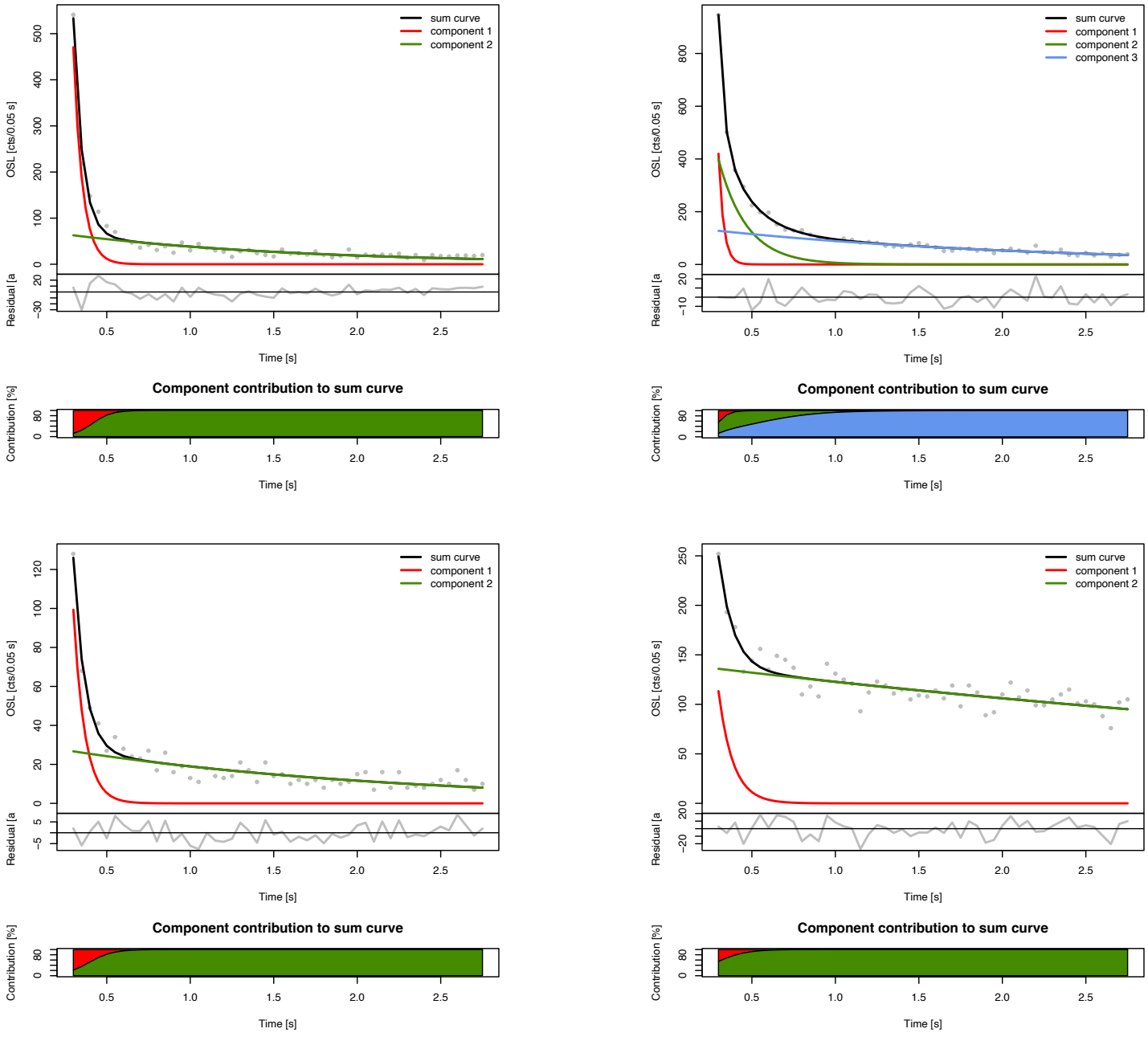

Figure S7. OSL decomposition of four randomly selected signals of sample ZR229.

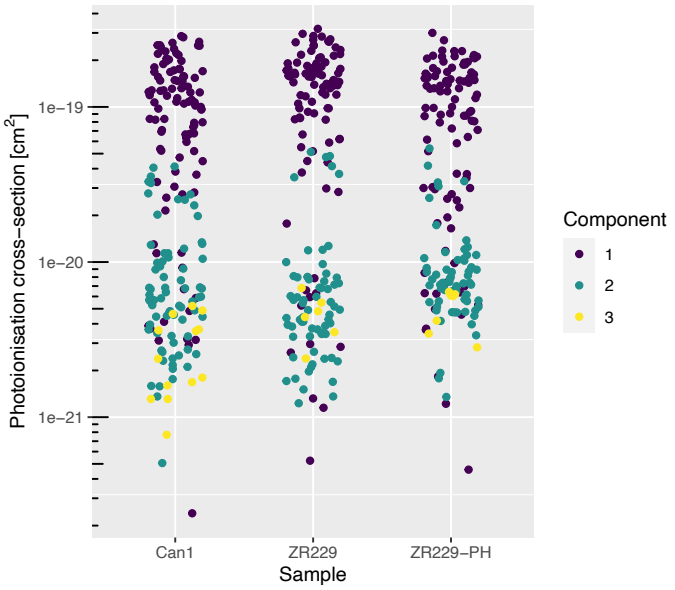

Figure S8. Summary of photoionisation cross-sections for 100 holes of a single-grain disc each for three samples, as derived from CW-OSL curve fitting.

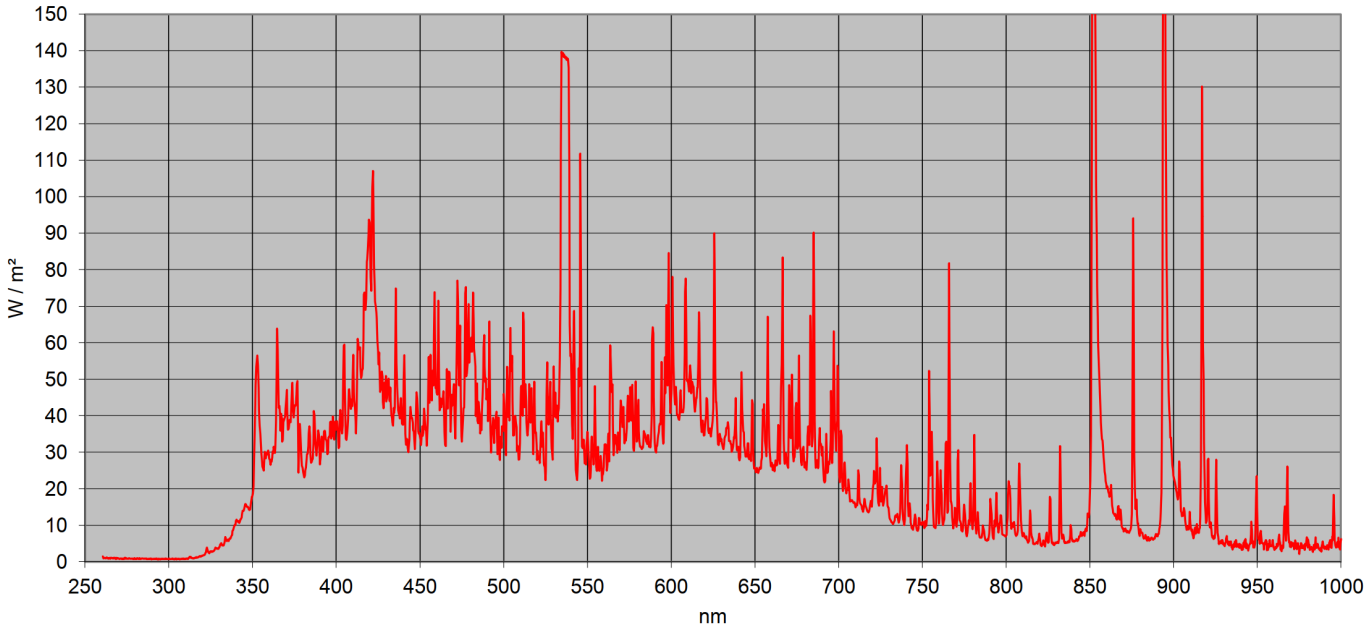

Figure S9. Emission spectrum of the bulb built in the Hönle UVACube 400 used to bleach the zircon samples (data from the manufacturer).