

**Archaean and Proterozoic crustal evolution in the Eastern Succession of the Mt Isa district, Australia: U–Pb and Hf-isotope studies of detrital zircons\***

W. L. GRIFFIN<sup>1,2†</sup>, E. A. BELOUSOVA<sup>1</sup>, S. G. WALTERS<sup>1,3</sup> AND S. Y. O'REILLY<sup>1</sup>

<sup>1</sup> *GEMOC ARC National Key Centre, Department of Earth and Planetary Sciences, Macquarie University, NSW 2109, Australia.*

<sup>2</sup> *CSIRO Exploration and Mining, North Ryde, NSW 2113, Australia.*

<sup>3</sup> *GeoDiscovery Group Pty Ltd, PO Box 59, Sherwood, Qld 4075, Australia*

**SUPPLEMENTARY PAPERS**

*Australian Journal of Earth Sciences* (2006) **53**, 125–149.

---

\* Appendix 2\* [indicated by an asterisk (\*) in the text and listed at the end of the paper] is a Supplementary Paper; copies may be obtained from the Geological Society of Australia's website ([www.gsa.org.au](http://www.gsa.org.au)) or from the National Library of Australia's Pandora archive (<http://nla.gov.au/nla.arc-25194>).

† Corresponding author: [bill.griffin@mq.edu.au](mailto:bill.griffin@mq.edu.au)

---

**Appendix 2** Zircons of the Eastern Succession of the Mt Isa Inlier.



Sample#	EMP (wt. %)							MC-ICPMS		RATIOS						AGES (Ma)									
	ZrO <sub>2</sub>	SiO <sub>2</sub>	HfO <sub>2</sub>	Y <sub>2</sub> O <sub>3</sub>	U <sub>2</sub> O <sub>3</sub>	ThO <sub>2</sub>	Total	ppm Yb	ppm Lu	<sup>207</sup> Pb/ <sup>206</sup> Pb	R.S.D.	<sup>206</sup> Pb/ <sup>238</sup> U	R.S.D.	<sup>207</sup> Pb/ <sup>235</sup> U	R.S.D.	<sup>208</sup> Pb/ <sup>232</sup> Th	R.S.D.	<sup>207</sup> Pb/ <sup>206</sup> Pb ± 2 σ	<sup>206</sup> Pb/ <sup>238</sup> U ± 2 σ	<sup>207</sup> Pb/ <sup>235</sup> U ± 2 σ	<sup>208</sup> Pb/ <sup>232</sup> Th ± 2 σ				
P9687-36	63.67	33.13	1.06	0.45	0.04	0.16	98.50	457	76	0.09543	1.03	0.26870	1.28	3.53679	1.29	0.07950	1.13	1536	38	1534	35	1535	20	1546	34
P9687-37	66.24	33.36	1.21	0.14	0.06	0.02	101.02	539	103	0.12216	1.09	0.23151	1.40	3.90093	1.44	0.08879	1.22	1988	38	1342	34	1613	23	1719	40
P9687-40	66.85	33.38	1.09	0.07	0.08	0.04	101.50	240	38	0.15269	1.00	0.31105	1.31	6.54828	1.30	0.12172	1.18	2376	34	1745	40	2052	23	2321	52
P9687-42	66.90	33.20	1.38	0.21	0.04	0.01	101.73			0.10546	1.05	0.30741	1.43	4.47552	1.45	0.07702	1.18	1722	38	1727	43	1726	24	1499	34
P9687-43	66.12	33.21	1.37	0.14	0.01	0.04	100.87	407	70	0.12146	1.30	0.28979	1.45	4.85336	1.60	0.03655	1.29	1977	46	1640	42	1794	27	725	18
P9687-44	66.21	33.43	1.48	0.12	0.00	0.02	101.25			0.09614	1.10	0.27200	1.40	3.60615	1.45	0.07228	1.19	1550	41	1550	39	1550	23	1410	32
P9687-45	66.72	33.56	1.38	0.07	0.09	0.00	101.82			0.10717	1.07	0.18983	1.39	2.80488	1.43	0.05134	1.19	1751	39	1120	29	1356	21	1012	24
P9687-46	66.12	33.42	1.54	0.04	0.07	0.03	101.20			0.09243	1.02	0.25463	1.27	3.24754	1.28	0.06169	1.12	1476	39	1462	33	1468	20	1209	26
P9687-47	66.79	32.67	1.50	0.16	0.00	0.07	101.18			0.09315	1.15	0.25338	1.45	3.25683	1.53	0.06594	1.18	1490	43	1455	38	1470	24	1290	29
P9687-48	65.54	33.55	1.53	0.00	0.00	0.02	100.64			0.10734	1.02	0.15386	1.36	2.27704	1.37	0.03098	1.16	1754	37	922	23	1205	19	616	14
P9687-49	65.89	33.31	1.46	0.01	0.02	0.00	100.69	884	135	0.11275	1.03	0.23962	1.38	3.72650	1.39	0.09054	1.17	1844	37	1384	34	1577	22	1751	39
P9687-50	65.73	32.84	1.43	0.11	0.00	0.00	100.13			0.09907	1.19	0.28282	1.47	3.86656	1.57	0.01705	1.11	1606	44	1605	42	1606	25	341	8
P9687-51	65.89	33.41	1.44	0.14	0.04	0.00	100.91	935	145	0.09894	1.26	0.27916	1.32	3.81114	1.48	0.06809	1.48	1604	47	1587	37	1595	24	1331	38
P9687-52	66.15	33.50	1.46	0.01	0.07	0.02	101.21			0.12822	1.03	0.26689	1.38	4.71627	1.39	0.10467	1.20	2073	36	1525	38	1770	23	2012	46
P9687-53	66.15	33.00	1.61	0.07	0.05	0.00	100.88			0.11134	1.19	0.18315	1.43	2.81048	1.51	0.03813	1.29	1821	43	1084	28	1358	23	756	19
P9687-54	66.49	33.40	1.49	0.04	0.09	0.00	101.51	636	103	0.09312	1.03	0.26008	1.34	3.33749	1.35	0.06430	1.18	1490	39	1490	36	1489	21	1259	29
P9687-55	65.29	33.30	1.23	0.27	0.07	0.02	100.17	585	95	0.09872	1.03	0.27635	1.35	3.75992	1.37	0.08025	1.18	1600	38	1572	38	1584	22	1560	36
P9687-56	65.95	33.45	1.68	0.05	0.05	0.02	101.20			0.10356	1.82	0.14926	1.52	2.13113	2.01	0.03798	1.50	1688	66	896	25	1158	28	753	22
P9687-59	66.02	33.50	1.18	0.04	0.05	0.03	100.81	258	46	0.11705	1.14	0.16597	1.33	2.67671	1.41	0.06341	1.25	1911	41	989	24	1322	21	1242	30
P9687-60	66.28	33.37	1.47	0.09	0.06	0.06	101.33	565	94	0.09232	1.05	0.25660	1.26	3.26126	1.29	0.07635	1.14	1473	40	1472	33	1471	20	1487	33
P9687-63	64.56	32.63	1.23	0.63	0.12	0.41	99.58			0.09651	1.09	0.16903	1.38	2.24888	1.43	0.02539	1.22	1557	41	1006	26	1196	20	506	12
<b>P9688</b>																									
P9688-2	66.56	33.51	1.43	0.08	0.08	0.04	101.71	504	73	0.10220	1.02	0.16858	1.31	2.37451	1.31	0.03217	1.18	1664	37	1004	24	1234	19	640	15
P9688-4	65.92	33.31	1.33	0.00	0.09	0.00	100.64	183	38	0.09451	1.03	0.26498	1.19	3.45270	1.20	0.07940	1.08	1518	39	1515	32	1516	19	1544	32
P9688-5	62.52	31.95	1.25	0.46	0.25	0.15	96.58	451	80	0.09405	1.03	0.26289	1.27	3.40704	1.29	0.07839	1.16	1509	39	1504	34	1506	20	1525	34
P9688-6	66.34	33.44	1.31	0.11	0.07	0.00	101.27	313	63	0.10616	1.14	0.24542	1.38	3.58841	1.45	0.08115	1.29	1734	41	1414	35	1546	23	1577	39
P9688-7	62.02	31.27	1.54	0.34	0.10	0.07	95.33	710	110	0.09450	1.02	0.26535	1.25	3.45580	1.26	0.07285	1.13	1518	38	1517	34	1517	20	1421	31
P9688-8	66.25	33.12	1.24	0.13	0.02	0.06	100.81			0.10022	1.19	0.28666	1.33	3.95085	1.43	0.09139	1.20	1628	44	1624	38	1624	23	1767	41
P9688-10	66.37	33.51	1.64	0.03	0.12	0.04	101.70	967	151	0.09400	1.07	0.26643	1.20	3.44879	1.25	0.04492	1.09	1508	40	1522	33	1515	20	888	19
P9688-11	65.55	32.98	1.38	0.18	0.09	0.06	100.23			0.09985	1.07	0.21671	1.36	2.98347	1.39	0.06799	1.21	1621	40	1264	31	1403	21	1329	31
P9688-12	66.03	33.55	1.85	0.01	0.09	0.05	101.58			0.13234	1.04	0.24036	1.24	4.38291	1.25	0.01834	1.09	2129	36	1388	31	1709	21	367	8
P9688-13	65.16	33.46	1.57	0.16	0.06	0.06	100.48	2871	360	0.10505	1.04	0.17988	1.27	2.60356	1.29	0.04382	1.12	1715	38	1066	25	1301	19	866	19
P9688-14	66.79	33.59	1.25	0.04	0.02	0.02	101.69	2246	271	0.09463	1.07	0.26899	1.33	3.50806	1.36	0.06787	1.19	1520	40	1535	36	1529	21	1327	31
P9688-16	65.60	33.35	1.31	0.01	0.06	0.02	100.34	2782	303	0.09648	1.09	0.16655	1.33	2.21461	1.37	0.03098	1.23	1557	41	993	24	1185	19	616	15
P9688-17	65.65	33.26	1.43	0.07	0.04	0.04	100.50	1901	265	0.09943	1.09	0.14598	1.39	2.00137	1.42	0.03129	1.21	1613	40	878	23	1115	19	622	15
P9688-18	65.13	33.41	1.25	0.11	0.07	0.02	99.98	1516	224	0.09880	0.99	0.28330	1.32	3.85863	1.30	0.04128	1.14	1601	37	1607	37	1605	21	817	18
P9688-19	65.34	33.19	1.16	0.11	0.09	0.03	99.92	808	146	0.08225	1.01	0.21193	1.35	2.40332	1.34	0.12907	1.16	1251	39	1239	31	1243	19	2453	54
P9688-20	65.19	33.29	1.20	0.05	0.14	0.00	99.88	763	109	0.09257	1.02	0.25262	1.41	3.22418	1.40	0.03929	1.17	1478	38	1451	37	1462	22	779	18
P9688-21	65.57	33.38	1.65	0.01	0.00	0.00	100.60	4726	546	0.09665	1.01	0.13227	1.32	1.76246	1.31	0.01772	1.13	1560	38	800	20	1031	17	355	8
P9688-23	65.60	33.38	1.55	0.03	0.13	0.07	100.76	1988	261	0.09547	1.01	0.26853	1.35	3.53474	1.33	0.08262	1.14	1537	37	1533	37	1535	21	1604	35
P9688-25	53.38	23.67	0.98	5.19	0.26	0.26	83.74	1273	176	0.09725	1.05	0.21672	1.30	2.90751	1.32	0.03208	1.15	1572	39	1264	30	1383	20	638	15
P9688-26	63.36	31.77	1.02	0.69	0.17	0.25	97.25			0.09695	1.04	0.14578	1.38	1.94833	1.39	0.02026	1.18	1566	39	877	23	1097	19	405	9
P9688-27	65.31	33.11	1.49	0.15	0.11	0.02	100.18			0.09536	1.00	0.26830	1.36	3.52756	1.34	0.08005	1.15	1535	37	1532	37	1533	21	1556	34
P9688-28	65.36	33.47	1.74	0.10	0.16	0.03	100.85	4348	509	0.09657	1.00	0.17939	1.38	2.38862	1.36	0.05297	1.15	1558	37	1063	27	1239	19	1043	23
P9688-31	66.19	33.38	1.22	0.20	0.03	0.03	101.05	2278	320	0.09570	1.14	0.21260	1.21	2.80835	1.30	0.05633	1.19	1541	42	1242	27	1357	19	1107	26
P9688-32	65.54	33.31	1.74	0.02	0.00	0.01	100.62	707	119	0.08980	1.06	0.24656	1.22	3.05814	1.26	0.06947	1.11	1421	40	1420	31	1422	19	1357	29
P9688-35	66.28	33.53	1.24	0.09	0.01	0.00	101.15	998	124	0.10216	1.10	0.24784	1.26	3.49335	1.32	0.09871	1.21	1663	40	1427	32	1525	21	1902	44
P9688-36	57.70	28.83	1.28	2.73	0.22	0.07	90.83	1914	203	0.10196	1.05	0.23033	1.22	3.24221	1.25	0.05701	1.12	1660	39	1336	29	1467	19	1120	25
P9688-37	65.25	32.95	1.74	0.10	0.13	0.03	100.20	997	139	0.08504	1.01	0.13848	1.30	1.62456	1.30	0.04585	1.16	1316	39	836	20	979	16	906	21
P9688-39	66.54	33.61	1.44	0.03	0.07	0.05	101.74	2928	341	0.10227	1.06	0.20464	1.25												

Sample#	EMP (wt. %)							MC-ICPMS		RATIOS								AGES (Ma)								
	ZrO <sub>2</sub>	SiO <sub>2</sub>	HfO <sub>2</sub>	Y <sub>2</sub> O <sub>3</sub>	U <sub>2</sub> O <sub>3</sub>	ThO <sub>2</sub>	Total	ppm Yb	ppm Lu	<sup>207</sup> Pb/ <sup>206</sup> Pb	R.S.D.	<sup>206</sup> Pb/ <sup>238</sup> U	R.S.D.	<sup>207</sup> Pb/ <sup>235</sup> U	R.S.D.	<sup>208</sup> Pb/ <sup>232</sup> Th	R.S.D.	<sup>207</sup> Pb/ <sup>206</sup> Pb ± 2 σ	<sup>206</sup> Pb/ <sup>238</sup> U ± 2 σ	<sup>207</sup> Pb/ <sup>235</sup> U ± 2 σ	<sup>208</sup> Pb/ <sup>232</sup> Th ± 2 σ					
P9688-41	66.07	33.48	1.41	0.02	0.04	0.00	101.01			0.09859	1.19	0.27977	1.41	3.80103	1.51	0.07194	1.28	1597	44	1590	40	1592	24	1404	35	
P9688-42	66.23	33.70	1.64	0.07	0.05	0.02	101.71	903	134	0.09305	1.03	0.25718	1.30	3.29953	1.31	0.07239	1.19	1488	39	1475	34	1480	20	1412	32	
P9688-43	64.43	32.25	1.70	0.15	0.12	0.02	98.67	973	149	0.09277	1.06	0.25443	1.22	3.25470	1.26	0.07780	1.12	1483	40	1461	32	1470	20	1514	33	
P9688-44	65.32	33.35	1.39	0.13	0.09	0.03	100.31	608	101	0.09455	1.05	0.26488	1.37	3.45219	1.39	0.07262	1.23	1519	39	1514	37	1516	22	1416	34	
P9688-45	52.42	24.18	1.00	6.74	0.17	0.16	84.66	1577	196	0.11224	1.02	0.16607	1.23	2.57110	1.25	0.01779	1.12	1836	37	990	23	1292	18	356	8	
P9688-46	66.21	33.27	1.18	0.16	0.00	0.00	100.82	707	126	0.09975	1.15	0.28600	1.44	3.92779	1.51	0.07580	1.28	1619	43	1621	41	1619	24	1476	36	
P9688-47	65.55	33.41	1.94	0.07	0.13	0.03	101.11	1077	145	0.08299	1.01	0.14988	1.27	1.71503	1.27	0.04262	1.13	1268	39	900	21	1014	16	843	19	
P9688-49	66.08	33.15	1.58	0.16	0.07	0.04	101.08	4086	551	0.09945	1.09	0.16832	1.27	2.30784	1.32	0.05217	1.17	1613	40	1002	24	1214	19	1027	23	
P9688-50	63.91	32.69	0.98	0.35	0.00	0.22	98.15	660	106	0.09600	1.04	0.20351	1.24	2.69352	1.26	0.04664	1.11	1547	39	1194	27	1326	19	921	20	
P9688-51	65.97	33.34	1.01	0.10	0.05	0.02	100.49	444	77	0.09788	1.14	0.26559	1.28	3.58450	1.37	0.08023	1.20	1584	43	1518	35	1546	22	1559	36	
P9688-51-rim										0.09460	1.13	0.26951	1.37	3.51369	1.43	0.07966	1.24	1520	42	1538	37	1530	23	1549	37	
P9688-53	65.10	33.47	1.20	0.18	0.03	0.07	100.03	764	127	0.09774	1.07	0.27569	1.25	3.71464	1.29	0.04360	1.17	1581	40	1569	35	1574	21	862	20	
P9688-54	65.72	33.42	1.38	0.19	0.07	0.03	100.80	750	120	0.09830	1.04	0.27696	1.24	3.75088	1.26	0.01565	1.15	1592	39	1576	35	1582	20	313	7	
<b>P9689</b>																										
P9689-13	48.49	21.90	1.25	2.29	0.14	0.23	74.29	1179	155	0.11201	1.04	0.24516	1.44	3.78564	1.43	0.03246	1.26	1832	37	1413	36	1589	23	645	16	
P9689-14	66.39	33.55	1.46	0.06	0.00	0.00	101.46	491	77	0.10787	1.12	0.26876	1.43	3.99761	1.47	0.04570	1.27	1763	41	1534	39	1633	24	903	23	
P9689-20	63.33	32.43	1.43	0.75	0.06	0.02	98.03			0.11372	1.41	0.20117	1.51	3.15413	1.71	0.04439	1.67	1859	50	1181	33	1446	26	877	29	
P9689-29	65.49	33.67	1.20	0.16	0.05	0.00	100.56	397	60	0.23940	1.13	0.34673	1.34			0.11697	1.21	3116	36	1918	45	2560	26	2235	51	
P9689-30	66.46	33.36	1.10	0.08	0.10	0.00	101.10			0.23707	1.17	0.28386	1.48	9.27964	1.52	0.18711	1.31	3100	37	1610	42	2366	28	3466	83	
P9689-33	66.16	33.32	1.00	0.04	0.01	0.04	100.55	670	105	0.10057	1.09	0.23345	1.40	3.23751	1.44	0.02522	1.31	1634	40	1352	34	1466	22	503	13	
P9689-35	65.96	33.60	0.96	0.04	0.00	0.02	100.57			0.11655	1.74	0.25099	1.57	4.03325	1.97	0.02936	1.81	1903	62	1443	40	1640	32	584	21	
P9689-36	65.84	33.47	1.15	0.20	0.03	0.05	100.74	303	518	0.11286	1.67	0.27645	2.32	4.29986	2.67	0.08905	2.34	1845	60	1573	65	1693	44	1724	77	
P9689-37	66.60	33.28	1.12	0.23	0.02	0.06	101.31	531	85	0.11189	1.24	0.32391	2.25	4.98205	2.41	0.08735	2.15	1830	45	1808	71	1816	41	1692	70	
P9689-39	65.05	33.44	1.06	0.55	0.04	0.08	100.20	1018	166	0.11100	1.49	0.32867	2.25	5.01733	2.54	0.09400	2.24	1815	54	1831	72	1822	43	1815	78	
P9689-42	66.06	33.25	1.55	0.07	0.09	0.02	101.03	134	18	0.16073	1.03	0.46674	2.34			0.08059	2.28	2463	35	2469	96	2464	43	1566	69	
P9689-43	57.65	27.67	1.21	1.94	0.03	0.50	89.00	1947	248	0.14192	1.14	0.19789	2.42	3.86694	2.43	0.02062	2.18	2250	39	1163	51	1606	39	412	18	
P9689-44	65.60	33.53	1.20	0.14	0.00	0.00	100.47	557	93	0.11227	1.12	0.23419	2.45	3.61902	2.45	0.05812	2.19	1836	40	1356	60	1553	39	1141	49	
P9689-44R										0.10987	1.21	0.30170	2.27	4.56312	2.38	0.09398	2.14	1797	44	1699	68	1742	40	1815	74	
P9689-46	57.15	27.45	1.46	2.24	0.13	0.03	88.44	2032	281	0.09989	1.05	0.19079	2.54	2.62265	2.46	0.04893	2.19	1621	39	1125	52	1307	36	965	41	
P9689-48	66.09	33.58	1.40	0.10	0.00	0.04	101.21	53	86	0.10732	1.35	0.30661	2.31	4.53779	2.45	0.10309	2.21	1754	49	1724	70	1737	41	1983	84	
P9689-50	65.61	33.09	1.39	0.04	0.18	0.00	100.31	820	144	0.10050	1.14	0.25223	2.18	3.49935	2.28	0.02454	2.08	1633	42	1449	57	1527	36	490	20	
P9689-51	65.20	33.53	1.62	0.01	0.00	0.00	100.36	1020	163	0.10946	1.19	0.26940	2.31	4.06518	2.38	0.08042	2.21	1790	43	1537	63	1647	39	1563	67	
P9689-53	65.28	33.30	1.86	0.09	0.14	0.00	100.68	3297	433	0.15123	1.01	0.24233	2.46	5.05201	2.41	0.09723	2.23	2359	34	1398	62	1828	41	1875	80	
P9689-57	67.20	33.54	1.36	0.03	0.00	0.03	102.17	370	64	0.13876	1.41	0.30988	2.43	5.92418	2.55	0.13825	2.36	2211	48	1740	74	1964	44	2617	116	
P9689-58	65.55	33.62	2.11	0.00	0.00	0.00	101.28	1161	167	0.16664	1.25	0.42411	2.05	9.75694	2.20	0.15113	2.03	2524	42	2279	79	2412	41	2844	108	
P9689-59	65.69	33.45	1.30	0.10	0.03	0.05	100.63	934	139	0.11860	1.21	0.19623	1.94	3.21372	2.08	0.05913	1.91	1935	43	1155	41	1460	32	1161	43	
P9689-60	64.51	32.33	1.03	0.35	0.09	0.14	98.44	4348	480	0.11019	1.56	0.17870	2.24	2.71587	2.52	0.01364	2.35	1802	56	1059	44	1332	37	273	13	
P9689-63	66.28	33.45	0.93	0.29	0.03	0.03	101.01	671	96	0.16726	1.03	0.48387	2.36			0.13536	2.19	2530	35	2544	99	2536	44	2565	106	
P9689-64	66.01	33.50	1.12	0.03	0.04	0.00	100.70	289	46	0.12417	1.19	0.29147	2.39	4.98976	2.44	0.11089	2.26	2017	42	1648	70	1817	41	2125	91	
<b>P9690</b>																										
P9690-1	62.29	31.73	1.49	1.13	0.19	0.11	96.94	4540	573	0.11429	1.05	0.18939	2.45	2.98409	2.49	0.01500	2.13	1868	38	1118	50	1403	38	300	13	
P9690-2	66.00	33.34	1.00	0.09	0.05	0.08	100.56	924	120	0.10337	1.09	0.18237	2.49	2.59915	2.54	0.00820	2.20	1685	40	1079	50	1300	37	165	7	
P9690-3	65.54	33.47	1.24	0.14	0.00	0.01	100.40	570	90	0.09615	1.05	0.23963	2.23	3.17495	2.23	0.06750	2.09	1550	39	1384	56	1451	34	1320	53	
P9690-5	66.26	33.66	1.14	0.11	0.09	0.07	101.33	934	119	0.09746	1.02	0.27608	2.29	3.70874	2.28	0.07145	2.07	1576	38	1571	64	1573	36	1394	56	
P9690-6	51.20	25.20	1.36	1.78	0.06	0.06	79.66	822	111	0.10555	1.09	0.25516	2.08	3.70830	2.10	0.08750	1.93	1723	40	1465	55	1573	34	1695	63	
P9690-7	64.84	33.38	1.35	0.10	0.00	0.05	99.72	471	72	0.10554	1.09	0.30728	2.50	4.47069	2.50	0.07544	2.23	1723	40	1727	76	1725	42	1470	63	
P9690-9	65.16	32.86	1.38	0.16	0.10	0.11	99.78	1393	192	0.09394	1.01	0.15059	2.36	1.95020	2.34	0.03314	2.14	1506	38	904	40	1098	31	659	28	
P9690-10	66.23	33.32	1.19	0.06	0.05	0.01	100.86	721	106	0.09487	1.03	0.26333	2.27	3.44502	2.27	0.06390	2.10	1525	39	1506	61	1514	36	1251	51	
P9690-12	65.22	33.59	1.70	0.02	0.04	0.03	100.60	569	78	0.15803	1.01	0.37060	2.52	8.07374	2.49	0.07332	2.29	2434	34	2032	88	2239	45	1430	63	
P9690-13	65.47	33.26	1.20	0.19	0.05	0.06	100.22	715	97	0.09928	1.11	0.27287	1.93	3.74439	1.96	0.00502	1.79	1610	41</							

Sample#	EMP (wt. %)							MC-ICPMS		RATIOS						AGES (Ma)										
	ZrO <sub>2</sub>	SiO <sub>2</sub>	HfO <sub>2</sub>	Y <sub>2</sub> O <sub>3</sub>	U <sub>2</sub> O <sub>3</sub>	ThO <sub>2</sub>	Total	ppm Yb	ppm Lu	<sup>207</sup> Pb/ <sup>206</sup> Pb	R.S.D.	<sup>206</sup> Pb/ <sup>238</sup> U	R.S.D.	<sup>207</sup> Pb/ <sup>235</sup> U	R.S.D.	<sup>208</sup> Pb/ <sup>232</sup> Th	R.S.D.	<sup>207</sup> Pb/ <sup>206</sup> Pb ± 2 σ	<sup>206</sup> Pb/ <sup>238</sup> U ± 2 σ	<sup>207</sup> Pb/ <sup>235</sup> U ± 2 σ	<sup>208</sup> Pb/ <sup>232</sup> Th ± 2 σ					
P9690-14	65.54	33.34	1.06	0.20	0.18	0.16	100.49	1259	171	0.09429	1.00	0.26398	2.01	3.44166	1.99	0.07218	1.86	1513	37	1510	54	1513	31	1408	51	
P9690-15	66.06	33.54	1.39	0.07	0.04	0.00	101.10	1871	290	0.08448	1.01	0.22970	2.10	2.67909	2.06	0.05719	1.92	1303	39	1332	51	1322	30	1124	42	
P9690-17	65.13	32.78	1.32	0.22	0.06	0.12	99.62	1638	231	0.10607	1.73	0.29493	2.15	4.32157	2.46	0.03732	2.38	1732	63	1666	63	1697	41	740	35	
P9690-18	65.71	33.84	1.42	0.10	0.05	0.07	101.17	1280	169	0.10491	1.05	0.30456	2.12	4.41545	2.10	0.08348	1.96	1712	38	1713	64	1715	35	1620	61	
P9690-19	65.91	33.37	1.46	0.05	0.09	0.00	100.87	1380	198	0.09107	1.09	0.24980	2.15	3.14486	2.15	0.09268	2.01	1447	41	1437	55	1443	33	1791	69	
P9690-20	66.44	33.63	1.05	0.13	0.00	0.00	101.26	1140	170	0.09160	1.04	0.25185	2.37	3.17308	2.25	0.06950	2.09	1459	39	1448	62	1450	35	1358	55	
P9690-21	65.47	33.55	1.63	0.05	0.02	0.01	100.73	566	76	0.14075	0.99	0.41441	2.16	8.05873	2.12	0.16572	2.03	2236	34	2235	82	2237	38	3099	117	
P9690-23	65.88	33.48	1.78	0.05	0.03	0.00	101.23	1008	149	0.09226	0.99	0.24573	2.26	3.12886	2.19	0.01212	2.06	1472	37	1416	57	1439	34	243	10	
P9690-25	66.24	33.43	1.58	0.00	0.14	0.02	101.41	392	66	0.09462	1.05	0.26831	2.44	3.49246	2.42	0.07971	2.32	1520	39	1532	67	1525	38	1550	69	
P9690-27	64.90	33.56	1.20	0.00	0.00	0.02	99.68	656	103	0.09746	1.06	0.27175	2.24	3.65086	2.24	0.03132	2.08	1576	39	1549	62	1560	36	623	25	
P9690-28	63.83	32.32	1.55	0.18	0.18	0.02	98.07	6088	765	0.09938	1.02	0.20322	2.32	2.78401	2.32	0.02469	2.15	1612	38	1192	50	1351	35	493	21	
P9690-29	65.24	33.56	1.25	0.13	0.09	0.01	100.28	564	86	0.10316	1.03	0.22963	2.33	3.26546	2.33	0.07193	2.17	1681	38	1332	56	1472	36	1403	59	
P9690-30	66.08	33.30	1.32	0.06	0.00	0.01	100.77	479	74	0.10961	1.07	0.27396	2.14	4.13272	2.11	0.09257	1.97	1792	39	1560	59	1660	35	1789	67	
P9690-31	66.13	33.49	1.81	0.01	0.00	0.00	101.43	21	3	0.05816	2.85	0.08164	2.43	0.65447	3.51	0.02429	2.92	535	124	505	24	511	28	484	28	
P9690-32	55.60	27.35	0.98	0.54	0.06	2.97	87.51	441	71	0.11364	1.15	0.25568	2.28	4.00595	2.32	0.04902	2.12	1858	41	1467	60	1635	38	967	40	
P9690-33	65.27	33.65	1.64	0.03	0.07	0.00	100.66	470	69	0.10041	1.11	0.26704	2.20	3.69473	2.21	0.01155	2.08	1631	41	1525	60	1570	35	232	10	
P9690-34	64.60	33.25	1.28	0.16	0.00	0.04	99.33	743	118	0.09774	1.01	0.27897	2.24	3.75970	2.21	0.02372	2.07	1581	38	1586	63	1584	36	473	19	
P9690-35	66.26	33.28	1.35	0.16	0.04	0.00	101.09			0.09714	1.23	0.26746	2.40	3.58309	2.46	0.07551	2.28	1569	45	1527	65	1545	39	1471	64	
P9690-36	66.18	33.43	1.38	0.24	0.02	0.03	101.29	456	81	0.09524	1.01	0.26793	2.31	3.52043	2.30	0.07506	2.12	1532	38	1530	63	1531	36	1462	60	
P9690-37	65.27	33.24	1.55	0.14	0.11	0.03	100.33			0.11393	2.92	0.21876	2.58	3.43697	3.54	0.04352	2.80	1862	104	1275	60	1512	56	860	47	
P9690-38	65.92	33.67	1.52	0.08	0.02	0.05	101.26	1657	212	0.10631	1.04	0.18658	2.30	2.73496	2.30	0.00946	2.11	1737	38	1102	47	1338	34	190	8	
P9690-41	66.05	33.24	1.11	0.15	0.05	0.00	100.60	794	126	0.10354	1.09	0.28538	2.37	4.07506	2.38	0.08599	2.17	1688	40	1618	68	1649	39	1667	70	
P9690-42	66.17	33.46	1.28	0.06	0.01	0.04	101.02			0.11729	1.06	0.20404	2.24	3.29885	2.23	0.01571	2.04	1915	38	1196	49	1480	35	315	13	
P9690-44	65.76	33.71	1.37	0.05	0.00	0.03	100.92			0.10021	1.07	0.18712	2.42	2.58592	2.41	0.03788	2.19	1628	39	1105	49	1296	35	751	32	
P9690-45	66.16	33.59	1.12	0.07	0.00	0.00	100.94	810	111	0.09885	1.12	0.24247	2.43	3.30529	2.44	0.04826	2.22	1602	41	1399	61	1482	38	952	41	
P9690-46	66.69	33.39	1.24	0.08	0.00	0.00	101.41	459	66	0.09730	1.01	0.27511	2.30	3.69040	2.27	0.01779	2.08	1573	38	1566	64	1569	36	356	15	
P9690-47	65.18	33.35	1.47	0.30	0.04	0.00	100.34	2159	280	0.10121	1.02	0.19395	2.36	2.70774	2.35	0.04504	2.13	1646	38	1142	49	1330	35	890	37	
P9690-48	65.88	33.69	1.12	0.05	0.02	0.00	100.76	280	46	0.15787	1.04	0.45279	2.43	9.85837	2.41	0.11674	2.20	2432	35	2407	98	2421	44	2231	93	
P9690-49	64.49	32.87	1.39	0.28	0.08	0.02	99.13	652	101	0.09612	1.00	0.27313	2.33	3.62152	2.30	0.05827	2.11	1550	37	1556	64	1554	37	1144	47	
P9690-50	65.59	33.58	1.22	0.09	0.05	0.01	100.54	1246	186	0.10085	1.09	0.20290	2.46	2.82128	2.44	0.04124	2.21	1639	40	1190	54	1361	37	816	35	
<b>P9691</b>																										
P9691-1	66.23	33.31	1.17	0.25	0.00	0.00	100.97	2474	378	0.09951	1.04	0.28241	2.33	3.87304	2.31	0.03800	2.18	1614	38	1603	66	1608	37	753	32	
P9691-2	64.60	32.82	1.89	0.13	0.08	0.00	99.53	4288	539	0.09483	1.05	0.21833	2.15	2.85645	2.14	0.04743	2.05	1524	39	1273	50	1370	32	936	38	
P9691-4	66.65	33.45	1.38	0.03	0.20	0.01	101.72	1268	194	0.09078	1.06	0.23397	2.24	2.94477	2.15	0.03985	2.03	1441	40	1355	55	1393	33	789	32	
P9691-5	62.45	31.83	1.97	0.47	0.19	0.07	96.98	3480	444	0.08656	0.98	0.16232	2.19	1.94613	2.13	0.01810	2.04	1350	37	969	40	1097	29	362	14	
P9691-6	65.92	33.47	1.10	0.13	0.04	0.05	100.71	867	112	0.10027	1.03	0.24732	2.29	3.45209	2.21	0.05262	2.07	1629	38	1424	59	1516	35	1036	42	
P9691-8	65.46	33.36	1.46	0.22	0.04	0.00	100.55	1566	205	0.09231	1.21	0.19439	2.29	2.49238	2.28	0.01532	2.22	1473	46	1145	48	1269	33	307	13	
P9691-9	65.11	33.19	0.96	0.44	0.00	0.04	99.74	912	139	0.09617	1.01	0.24787	2.16	3.29163	2.13	0.05379	2.01	1551	38	1427	55	1479	33	1059	41	
P9691-10	66.35	33.24	1.46	0.03	0.00	0.03	101.11	158	23	0.15453	0.98	0.43399	2.14	9.23392	2.08	0.11525	1.95	2396	33	2323	84	2361	38	2204	82	
P9691-11	65.38	32.93	1.41	0.28	0.06	0.15	100.20	551	84	0.09332	1.02	0.24319	2.23	3.14724	2.17	0.02587	2.05	1494	38	1403	56	1444	33	516	21	
P9691-13	65.89	33.57	1.24	0.06	0.06	0.03	100.85	227	35	0.09803	1.17	0.27879	2.39	3.84195	2.36	0.07413	2.13	1586	43	1585	67	1601	38	1445	59	
P9691-14	66.92	33.46	0.99	0.11	0.00	0.07	101.55	252	39	0.10065	0.96	0.29021	2.23	4.07179	2.13	0.07781	1.98	1636	36	1642	65	1648	35	1514	58	
P9691-15	66.30	33.54	1.32	0.00	0.11	0.00	101.27	2620	352	0.09091	1.39	0.24648	2.37	3.13440	2.43	0.05456	2.36	1444	52	1420	60	1441	37	1073	49	
P9691-17	65.11	32.88	1.96	0.04	0.11	0.00	100.09	1690	288	0.09136	0.96	0.25347	2.31	3.25129	2.20	0.07993	2.05	1453	36	1456	60	1469	34	1554	61	
P9691-18	66.64	33.24	0.96	0.05	0.05	0.06	101.00	945	142	0.09485	0.96	0.26424	2.10	3.43599	1.97	0.06482	1.82	1525	36	1511	57	1512	31	1269	45	
P9691-19	65.74	32.93	1.01	0.37	0.01	0.08	100.13	4024	526	0.10078	1.07	0.17127	2.38	2.41027	2.29	0.03780	2.12	1638	40	1019	45	1245	33	749	31	
P9691-19R										0.09276	1.15	0.25792	2.43	3.35779	2.34	0.05264	2.17	1482	44	1479	64	1494	37	1036	44	
P9691-20	60.05	29.24	1.46	1.63	0.16	0.08	92.62	2932	349	0.09865	0.96	0.27880	2.36	3.83682	2.24	0.03978	2.09	1598	36	1585	66	1600	36	788	32	
P9691-21	63.25	32.67	1.61	0.47	0.12	0.03	98.14	1365	191	0.09324	0.92	0.25955	2.44	3.43938	2.25	0.06124	2.04	1492	35	1487	65	1513	35			

Sample#	EMP (wt. %)							MC-ICPMS		RATIOS						AGES (Ma)										
	ZrO <sub>2</sub>	SiO <sub>2</sub>	HfO <sub>2</sub>	Y <sub>2</sub> O <sub>3</sub>	U <sub>2</sub> O <sub>3</sub>	ThO <sub>2</sub>	Total	ppm Yb	ppm Lu	<sup>207</sup> Pb/ <sup>206</sup> Pb	R.S.D.	<sup>206</sup> Pb/ <sup>238</sup> U	R.S.D.	<sup>207</sup> Pb/ <sup>235</sup> U	R.S.D.	<sup>208</sup> Pb/ <sup>232</sup> Th	R.S.D.	<sup>207</sup> Pb/ <sup>206</sup> Pb ± 2σ	<sup>206</sup> Pb/ <sup>238</sup> U ± 2σ	<sup>207</sup> Pb/ <sup>235</sup> U ± 2σ	<sup>208</sup> Pb/ <sup>232</sup> Th ± 2σ					
P9691-23	65.84	33.38	1.55	0.02	0.01	0.07	100.87	3082	413	0.09338	1.02	0.18826	2.46	2.42325	2.41	0.04875	2.24	1495	38	1111	50	1249	35	962	42	
P9691-24	65.17	33.32	1.54	0.02	0.09	0.00	100.13	3116	344	0.09705	1.02	0.16961	2.33	2.27793	2.27	0.02433	2.14	1568	38	1009	44	1205	32	485	21	
P9691-25	63.31	31.72	1.23	0.33	0.15	0.13	96.87	2421	309	0.10045	0.98	0.16059	2.40	2.23096	2.31	0.05274	2.18	1632	36	960	43	1190	32	1038	44	
P9691-26	66.34	33.24	1.00	0.15	0.03	0.00	100.75	1599	215	0.11320	1.01	0.32367	2.32	5.06169	2.26	0.10789	2.13	1851	36	1807	73	1829	38	2070	84	
P9691-27	65.88	33.54	1.47	0.06	0.04	0.07	101.07	1310	180	0.09663	1.38	0.15912	2.41	2.13023	2.47	0.03099	2.29	1560	51	951	43	1158	34	616	28	
P9691-28	65.95	33.34	1.07	0.31	0.05	0.00	100.71	976	154	0.09668	0.98	0.26789	2.35	3.57657	2.28	0.05272	2.14	1561	37	1530	64	1544	36	1038	43	
P9691-30	59.90	30.48	1.33	1.82	0.23	0.01	93.76	1813	283	0.09001	0.97	0.20537	2.12	2.55011	2.02	0.04413	1.97	1425	37	1204	47	1286	29	872	34	
P9691-31	65.60	33.72	1.06	0.23	0.00	0.00	100.62	738	107	0.10048	1.43	0.26377	2.42	3.67104	2.49	0.08215	2.22	1633	53	1509	65	1565	40	1595	68	
P9691-32	65.74	33.74	1.42	0.11	0.04	0.00	101.04	561	89	0.11323	1.07	0.30857	2.41	4.84051	2.33	0.09043	2.20	1851	38	1733	73	1791	39	1749	74	
P9691-33	60.72	31.20	1.01	1.19	0.21	0.61	94.94	1225	180	0.08488	0.98	0.13244	2.36	1.56053	2.26	0.03295	2.15	1312	38	801	36	954	28	655	28	
P9691-34	65.70	33.53	0.95	0.25	0.07	0.01	100.51	2417	290	0.10192	1.00	0.25437	2.36	3.60317	2.26	0.07293	2.14	1659	37	1460	62	1550	36	1422	59	
P9691-35	64.89	33.21	1.04	0.71	0.08	0.02	99.93	2209	313	0.10111	1.04	0.27197	2.50	3.79205	2.44	0.06855	2.23	1644	38	1550	69	1591	39	1340	58	
P9691-36	63.25	32.09	1.28	0.55	0.08	0.04	97.28	3617	489	0.09923	1.04	0.21333	2.33	2.93608	2.26	0.04526	2.14	1609	38	1246	53	1391	34	894	38	
P9691-37	64.77	33.08	1.00	0.91	0.09	0.03	99.90	1304	174	0.09962	1.00	0.26141	2.34	3.61427	2.25	0.05839	2.16	1616	37	1497	63	1552	36	1147	48	
P9691-38	64.83	33.13	1.21	0.61	0.00	0.04	99.81	1602	237	0.09741	1.01	0.27397	2.24	3.68715	2.18	0.06105	2.10	1575	38	1560	62	1568	35	1197	49	
P9691-39	65.67	33.51	1.38	0.09	0.00	0.01	100.65	456	74	0.10855	1.12	0.29165	2.49	4.37229	2.43	0.08085	2.23	1775	41	1649	73	1707	40	1571	67	
P9691-40	60.03	30.70	1.22	1.09	0.18	0.17	93.39	2927	333	0.10138	1.01	0.19064	2.16	2.66078	2.04	0.02896	1.97	1649	37	1124	44	1317	30	576	22	
P9691-41	65.32	33.10	1.72	0.13	0.14	0.01	100.42	1059	135	0.10569	0.98	0.28115	2.34	4.13276	2.24	0.04746	2.13	1726	36	1597	66	1660	37	937	39	
P9691-42	64.83	32.41	1.60	0.11	0.14	0.05	99.15	1739	211	0.09340	0.97	0.16024	2.24	2.06951	2.13	0.02435	2.05	1496	37	958	40	1138	29	486	20	
P9691-43	66.61	33.50	1.25	0.16	0.00	0.04	101.56			0.10450	1.06	0.30250	2.34	4.37999	2.32	0.07798	2.17	1705	39	1703	70	1708	38	1517	63	
P9691-43R										0.10626	1.11	0.31038	2.34	4.56968	2.32	0.08871	2.18	1736	41	1742	71	1743	39	1717	72	
P9691-44	65.69	33.13	1.32	0.17	0.14	0.07	100.51	573	99	0.09293	1.01	0.20977	2.35	2.69424	2.31	0.02698	2.19	1486	38	1227	53	1326	34	538	23	
P9691-45	65.51	33.35	1.30	0.13	0.01	0.05	100.35	369	64	0.05481	3.14	0.03944	2.33	3.03142	3.64	0.01182	2.45	404	136	249	11	267	17	237	12	
P9691-46	65.04	33.53	0.99	0.19	0.00	0.05	99.81	358	59	0.09974	1.12	0.28709	2.32	3.97948	2.30	0.08349	2.12	1619	42	1626	67	1630	37	1620	66	
P9691-47	62.63	30.73	1.31	1.25	0.07	0.16	96.15	1597	212	0.14915	1.01	0.25455	2.31	5.27441	2.24	0.03013	2.12	2336	34	1461	61	1864	38	599	25	
P9691-48	59.06	28.62	0.96	1.98	0.13	0.05	90.80	3134	433	0.09980	1.07	0.28594	2.45	3.94053	2.41	0.06343	2.27	1620	40	1621	70	1622	39	1242	55	
P9691-49	53.15	30.94	1.10	0.17	0.57	0.56	86.49	1925	264	0.09909	1.25	0.14347	2.59	1.95966	2.61	0.02131	2.44	1607	46	864	42	1101	35	426	21	
P9691-50	66.09	33.19	1.20	0.16	0.12	0.06	100.83			0.10794	1.23	0.18055	2.60	2.68592	2.61	0.04759	2.44	1765	45	1070	51	1324	39	939	45	
P9691-51	53.36	25.47	1.24	2.27	0.27	0.06	82.67	1540	237	0.09644	0.96	0.27727	2.37	3.73024	2.23	0.08254	2.12	1556	36	1577	66	1577	36	1603	65	
P9691-52	65.06	33.36	1.19	0.81	0.14	0.01	100.57	1772	248	0.10444	1.06	0.20941	2.62	3.01527	2.58	0.07008	2.40	1704	39	1225	59	1411	39	1368	63	
P9691-53	58.14	29.36	2.10	2.56	0.13	0.32	92.60	6013	703	0.09620	1.00	0.20415	2.30	2.77601	2.19	0.00729	2.06	1551	37	1197	50	1349	33	146	6	
P9691-54	61.23	30.32	1.43	1.20	0.07	0.00	94.25	3740	528	0.09831	1.00	0.26792	2.46	3.63812	2.33	0.04731	2.24	1592	37	1530	67	1557	37	934	41	
P9691-55	60.65	30.38	1.79	1.00	0.14	0.15	94.10	1640	216	0.09493	0.98	0.26738	2.36	3.54430	2.20	0.02677	2.13	1526	37	1527	64	1537	35	533	22	
P9691-56	65.52	33.65	1.00	0.07	0.00	0.01	100.25	384	60	0.14974	0.93	0.44746	2.45	9.27901	2.27	0.12577	2.18	2342	32	2383	97	2365	42	2394	98	
P9691-57	62.86	32.57	1.27	1.66	0.11	0.08	98.55	3372	382	0.09176	0.94	0.21297	2.20	2.77409	2.06	0.04709	1.93	1462	35	1244	50	1348	31	930	35	
<b>P9692</b>																										
P9692-2	65.61	32.50	1.13	0.75	0.11	0.09	100.18	2545	354	0.10038	1.02	0.28502	2.54	3.94070	2.50	0.04741	2.38	1631	38	1616	73	1622	41	936	44	
P9692-3	66.57	32.56	1.36	0.09	0.00	0.04	100.63	4096	439	0.08953	1.07	0.18813	2.87	2.31131	2.78	0.04101	2.63	1415	41	1111	59	1215	39	812	42	
P9692-8	64.33	31.20	1.10	0.28	0.15	0.06	97.12	1527	209	0.09345	1.05	0.26210	2.47	3.37447	2.45	0.04112	2.31	1496	39	1500	66	1498	38	814	37	
P9692-10	65.01	32.05	1.08	0.30	0.07	0.21	98.71			0.09776	1.29	0.26927	2.67	3.62647	2.74	0.03208	2.59	1581	48	1537	73	1555	44	638	32	
P9692-12	64.87	32.59	1.18	0.86	0.10	0.00	99.59	1026	149	0.10420	1.03	0.30182	2.47	4.33103	2.44	0.07924	2.32	1700	38	1700	74	1699	40	1541	69	
P9692-22	66.24	32.99	1.18	0.00	0.00	0.06	100.47	97	17	0.10562	1.08	0.30717	2.67	4.46748	2.65	0.08450	2.52	1725	39	1726	81	1724	44	1639	79	
P9692-24	66.90	32.76	1.50	0.08	0.04	0.02	101.31	1478	208	0.10181	1.04	0.21397	2.52	3.00093	2.51	0.01754	2.39	1657	38	1249	57	1407	38	351	17	
P9692-25	65.86	32.98	1.65	0.37	0.00	0.00	100.85	1590	225	0.10328	1.02	0.29105	2.58	4.14115	2.54	0.08516	2.41	1683	37	1646	75	1662	42	1651	76	
P9692-26	61.56	30.42	1.16	1.09	0.11	0.10	94.43	3101	384	0.10124	1.10	0.14024	2.52	1.95673	2.53	0.03441	2.38	1646	40	846	40	1100	34	683	32	
P9692-28	64.22	32.30	1.67	0.23	0.06	0.02	98.49			0.15105	1.02	0.24401	2.56	5.07792	2.54	0.03999	2.40	2357	35	1407	65	1832	43	792	37	
P9692-33	65.46	32.92	1.46	0.12	0.08	0.06	100.10			0.10729	1.16	0.27808	2.58	4.11103	2.61	0.07193	2.45	1753	42	1581	72	1656	43	1403	66	
P9692-35	66.50	32.92	1.43	0.05	0.09	0.06	101.05			0.14763	7.58	0.31006	4.14	6.30047	7.64	0.08859	5.84	2318	249	1740	126	2018	134	1715	192	
P9692-36	65.56	33.23	1.31	0.14	0.16	0.02	100.42	2060	252	0.09495	1.07	0.12849	2.41	1.68130	2.42	0.02492	2.29	1527	40	779	35	1001	31	497	22	
P9692-37	57.89	27.84	1.37	1.87	0.12	0.33	89.42			0.103																

Sample#	EMP (wt. %)							MC-ICPMS		RATIOS						AGES (Ma)									
	ZrO <sub>2</sub>	SiO <sub>2</sub>	HfO <sub>2</sub>	Y <sub>2</sub> O <sub>3</sub>	U <sub>2</sub> O <sub>3</sub>	ThO <sub>2</sub>	Total	ppm Yb	ppm Lu	<sup>207</sup> Pb/ <sup>206</sup> Pb	R.S.D.	<sup>206</sup> Pb/ <sup>238</sup> U	R.S.D.	<sup>207</sup> Pb/ <sup>235</sup> U	R.S.D.	<sup>208</sup> Pb/ <sup>232</sup> Th	R.S.D.	<sup>207</sup> Pb/ <sup>206</sup> Pb ± 2 σ	<sup>206</sup> Pb/ <sup>238</sup> U ± 2 σ	<sup>207</sup> Pb/ <sup>235</sup> U ± 2 σ	<sup>208</sup> Pb/ <sup>232</sup> Th ± 2 σ				
P9692-39	63.63	32.43	1.27	1.57	0.10	0.09	99.07	3448	472	0.10244	1.01	0.30024	2.65	4.23622	2.60	0.08648	2.46	1668	37	1692	79	1681	43	1676	79
P9692-40	63.95	31.49	1.24	0.59	0.10	0.19	97.57			0.10750	1.10	0.24855	2.49	3.68218	2.49	0.04701	2.32	1757	40	1430	64	1567	40	928	42
P9692-43	63.65	31.15	1.39	0.33	0.14	0.14	96.80			0.09491	1.18	0.21570	2.66	2.81979	2.66	0.05701	3.98	1526	44	1259	61	1360	40	1120	54
P9692-45	64.68	32.58	1.13	1.18	0.11	0.04	99.71	3410	478	0.09899	1.01	0.24331	2.62	3.31673	2.58	0.07401	2.58	1605	38	1403	66	1484	40	1443	68
P9692-47	63.71	32.67	1.01	0.99	0.00	0.06	98.43	1501	231	0.11060	1.33	0.31323	2.64	4.77314	2.89	0.09830	2.58	1809	48	1756	81	1780	48	1895	93
P9692-48	66.38	32.69	1.62	0.08	0.04	0.00	100.81			0.10601	1.58	0.26037	2.75	3.80238	3.06	0.05725	2.71	1731	57	1491	73	1593	49	1125	59
P9692-50	62.00	31.10	1.47	1.40	0.10	0.07	96.14	3106	380	0.10213	1.07	0.28734	2.21	4.04101	2.28	0.08350	2.10	1663	39	1628	64	1642	37	1620	65
P9692-51	63.57	32.17	1.19	1.16	0.12	0.23	98.42	3775	457	0.10930	1.09	0.31682	2.57	4.77066	2.76	0.04881	2.42	1787	39	1774	80	1779	46	963	45
P9692-52	63.78	32.37	1.23	1.42	0.05	0.00	98.85	3810	619	0.10919	1.11	0.29090	2.63	4.37712	2.81	0.08469	2.47	1785	40	1646	76	1708	46	1643	78
P9692-53	66.54	33.37	1.38	0.00	0.01	0.03	101.33	1686	242	0.10157	1.13	0.28751	2.44	4.02528	2.64	0.08192	2.36	1653	42	1629	70	1639	43	1591	72
P9692-54	66.67	33.02	1.53	0.09	0.04	0.00	101.35	505	85	0.11433	1.38	0.32409	2.47	5.10622	2.78	0.08386	2.50	1869	49	1809	78	1837	47	1627	79
<b>P9693</b>																									
P9693-2	65.88	33.18	1.37	0.11	0.00	0.00	100.55	847	112	0.11522	1.11	0.32306	2.64	5.12908	2.61	0.09482	2.42	1883	40	1804	83	1840	44	1830	85
P9693-3	64.50	32.54	1.21	0.59	0.07	0.13	99.04	410	75	0.10013	1.04	0.25018	2.57	3.45364	2.53	0.07732	2.43	1626	38	1439	66	1516	40	1505	71
P9693-4	62.44	31.55	1.65	0.03	0.21	0.00	95.87	856	131	0.09294	1.01	0.22474	2.42	2.87916	2.42	0.64350	2.29	1486	38	1306	57	1376	37		362
P9693-8	66.95	33.02	1.26	0.05	0.00	0.00	101.28	381	62	0.10043	1.09	0.28539	2.43	3.95110	2.45	0.10644	2.35	1632	40	1618	70	1624	40	2044	91
P9693-9	64.50	31.68	1.74	0.03	0.17	0.00	98.12	2788	334	0.09461	1.08	0.14215	2.47	1.85423	2.48	0.01780	2.36	1520	40	856	40	1064	33	356	17
P9693-10	66.38	33.34	1.47	0.08	0.04	0.00	101.31	568	86	0.10306	1.03	0.29476	2.38	4.18555	2.39	0.08590	2.26	1679	38	1665	70	1671	39	1665	72
P9693-10R										0.10376	1.06	0.28775	2.33	4.11233	2.35	0.07101	2.24	1692	39	1630	67	1656	38	1386	60
P9693-11	66.61	33.46	1.51	0.05	0.04	0.00	101.67	2004	290	0.10292	1.12	0.23186	2.54	3.28757	2.51	0.02745	2.40	1677	41	1344	62	1478	39	547	26
P9693-12	65.11	32.88	1.45	0.04	0.06	0.00	99.55			0.10328	1.13	0.29190	2.57	4.15476	2.55	0.10027	2.40	1683	41	1651	75	1665	42	1931	89
P9693-13	64.12	31.71	1.30	0.07	0.36	0.00	97.56	873	130	0.08687	1.00	0.14380	2.41	1.72395	2.37	0.02713	2.25	1357	38	866	39	1017	30	541	24
P9693-14	65.58	32.79	1.60	0.11	0.05	0.02	100.14			0.10306	1.36	0.25533	2.67	3.61818	2.70	0.06830	2.55	1679	50	1465	70	1553	43	1335	66
P9693-15	66.45	33.23	1.32	0.07	0.00	0.01	101.07	534	82	0.10036	1.03	0.28851	2.49	3.99337	2.44	0.09693	2.29	1630	38	1634	72	1632	40	1869	82
P9693-16	62.76	30.73	1.48	0.32	0.13	0.18	95.61	1119	162	0.10555	0.99	0.30687	2.44	4.46800	2.38	0.08968	2.24	1723	36	1725	74	1725	39	1735	75
P9693-17	66.71	32.87	1.57	0.21	0.00	0.01	101.36	841	119	0.10090	1.01	0.28644	2.44	3.98989	2.38	0.08186	2.26	1640	37	1623	70	1632	39	1590	69
P9693-18	65.51	32.95	1.27	0.47	0.06	0.12	100.38	1774	210	0.09425	0.99	0.19832	2.50	2.57847	2.43	0.05554	2.29	1513	37	1166	53	1294	36	1092	49
P9693-19	65.60	32.74	1.27	0.28	0.10	0.13	100.13	522	90	0.10257	1.09	0.24709	2.56	3.49080	2.50	0.06963	2.37	1671	40	1423	65	1525	39	1360	63
P9693-20	44.73	25.24	1.37	5.71	0.06	0.28	77.39	402	65	0.10391	1.04	0.29935	2.48	4.29016	2.42	0.07778	2.29	1695	38	1688	74	1691	40	1514	67
P9693-21	66.24	33.35	1.24	0.15	0.00	0.00	100.97	598	98	0.09217	1.13	0.21050	2.57	2.67025	2.50	0.04862	2.49	1470	43	1231	58	1320	37	959	47
P9693-23	67.37	33.08	1.10	0.08	0.04	0.00	101.67	1257	156	0.10643	1.08	0.16126	2.48	2.36899	2.43	0.01554	2.32	1739	39	963	44	1233	35	311	14
P9693-24	66.40	33.24	1.40	0.12	0.00	0.07	101.24	576	94	0.09346	1.28	0.18892	2.65	2.42314	2.61	0.05907	2.69	1497	48	1115	54	1249	38	1159	61
P9693-25	66.83	33.05	1.12	0.24	0.08	0.01	101.33	540	78	0.09981	1.03	0.28236	2.44	3.89471	2.36	0.07447	2.27	1620	38	1603	69	1612	38	1451	63
P9693-26	63.62	31.91	1.14	0.12	0.17	0.00	96.97	707	105	0.09246	1.02	0.16709	2.41	2.13406	2.34	0.04240	2.26	1476	38	996	45	1159	32	839	37
P9693-27	65.87	32.68	1.28	0.44	0.04	0.08	100.39	2866	379	0.09931	1.07	0.13865	2.53	1.89631	2.43	0.01235	2.35	1611	40	837	40	1079	32	248	11
P9693-28	63.90	31.75	2.04	0.00	0.23	0.02	97.93	1350	204	0.09800	1.42	0.24735	2.71	3.31254	2.68	0.04671	2.59	1586	53	1424	69	1484	42	922	47
P9693-29	66.99	33.10	1.35	0.12	0.01	0.00	101.57	485	71	0.10398	0.98	0.29578	2.44	4.24809	2.35	0.08741	2.23	1696	36	1670	72	1683	39	1693	72
P9693-30	65.80	33.16	1.52	0.25	0.00	0.00	100.74	501	82	0.10069	1.00	0.28712	2.63	3.96896	2.46	0.07741	2.30	1636	37	1627	76	1627	40	1507	67
P9693-31	66.10	33.29	1.30	0.20	0.00	0.00	100.90	634	84	0.10095	0.96	0.28710	2.60	3.98482	2.42	0.07252	2.28	1641	36	1627	75	1631	39	1415	62
P9693-32	61.91	31.25	1.65	0.40	0.27	0.10	95.57	1814	227	0.08846	1.01	0.13725	2.35	1.67615	2.30	0.04706	2.17	1392	38	829	37	999	29	929	39
P9693-33	60.84	31.14	1.52	0.58	0.14	0.11	94.33	1782	233	0.09391	1.03	0.15261	2.31	1.97589	2.28	0.05390	2.13	1506	39	915	39	1107	31	1061	44
P9693-35	66.43	33.34	1.24	0.07	0.00	0.01	101.08	819	114	0.10886	1.01	0.26689	1.13	4.00763	1.12	0.08336	0.97	1780	37	1524	31	1635	18	1618	30
P9693-36	67.09	33.22	1.34	0.07	0.02	0.00	101.74	800	128	0.09862	1.05	0.16096	1.24	2.19085	1.24	0.01746	1.03	1598	39	962	22	1178	17	349	7
P9693-38	62.34	30.96	2.96	0.06	0.24	0.00	96.55	1020	151	0.10309	1.04	0.18778	1.12	2.66721	1.14	0.06256	1.02	1680	38	1109	23	1319	17	1226	24
P9693-40R										0.08327	1.01	0.11287	1.17	1.29536	1.16	0.05265	1.04	1275	39	689	15	843	13	1037	21
P9693-41	63.99	31.90	1.50	0.42	0.13	0.06	98.01	1082	145	0.10239	1.06	0.22266	1.15	3.14442	1.18	0.06406	0.97	1667	39	1295	27	1443	18	1254	23
P9693-42	64.84	32.19	1.54	0.07	0.09	0.00	98.72	1424	195	0.09327	0.99	0.20705	1.26	2.65936	1.21	0.07176	1.02	1493	37	1213	28	1317	18	1400	28
P9693-43	61.93	31.33	1.89	0.17	0.35	0.00	95.66	751	120	0.0732	0.98	0.09713	1.23	0.97979	1.18	0.09038	1.00	1019	39	597	14	693	12	1748	33
P9693-47	66.55	32.76	1.37	0.29	0.07	0.09	101.11	818	103	0.10795	0.97	0.24465	1.31	3.64584	1.27	0.07612	1.14	1765	35	1410	33	1559	20	1482	33
P9693-48	67.26	33.09	1.26	0.07	0.00	0.00	101.67	974	145	0.11276	2.06	0.16267	1.57	2.52874											

Sample#	EMP (wt. %)							MC-ICPMS		RATIOS								AGES (Ma)									
	ZrO <sub>2</sub>	SiO <sub>2</sub>	HfO <sub>2</sub>	Y <sub>2</sub> O <sub>3</sub>	U <sub>2</sub> O <sub>3</sub>	ThO <sub>2</sub>	Total	ppm Yb	ppm Lu	<sup>207</sup> Pb/ <sup>206</sup> Pb	R.S.D.	<sup>206</sup> Pb/ <sup>238</sup> U	R.S.D.	<sup>207</sup> Pb/ <sup>235</sup> U	R.S.D.	<sup>208</sup> Pb/ <sup>232</sup> Th	R.S.D.	<sup>207</sup> Pb/ <sup>206</sup> Pb ± 2 σ	<sup>206</sup> Pb/ <sup>238</sup> U ± 2 σ	<sup>207</sup> Pb/ <sup>235</sup> U ± 2 σ	<sup>208</sup> Pb/ <sup>232</sup> Th ± 2 σ						
P9693-52	66.06	32.92	1.14	0.26	0.12	0.24	100.76	736	95	0.10553	0.98	0.22889	1.33	3.33267	1.29	0.06887	1.15	1723	36	1328	32	1488	20	1346	30		
P9693-54	57.52	30.82	5.20	0.31	0.28	0.00	94.12	3040	562	0.10445	1.01	0.25433	1.41	3.66108	1.38	0.08612	1.22	1704	37	1460	37	1562	22	1669	39		
P9693-55	62.20	30.90	1.32	0.92	0.09	0.16	95.59	4945	576	0.10849	1.05	0.20401	1.23	3.0556	1.25	0.05473	1.13	1774	38	1196	27	1421	19	1077	24		
P9693-56	65.82	32.53	1.72	0.04	0.07	0.04	100.22	971	149	0.10466	0.99	0.26232	1.29	3.78805	1.26	0.08215	1.14	1708	36	1501	34	1590	20	1595	35		
P9693-57	65.29	32.56	1.56	0.12	0.06	0.08	99.67	994	136	0.09113	0.98	0.15018	1.39	1.8864	1.34	0.03861	1.19	1449	37	901	23	1076	18	765	18		
P9693-58	67.18	32.91	1.51	0.07	0.00	0.00	101.66	577	93	0.08444	0.97	0.11572	1.33	1.34716	1.29	0.06829	1.17	1302	38	705	18	866	15	1335	30		
P9693-59	65.64	32.95	1.31	0.27	0.11	0.10	100.37	886	140	0.10631	0.99	0.26079	1.26	3.81972	1.23	0.07479	1.14	1737	36	1493	34	1596	20	1457	32		
P9693-60	59.88	31.46	1.66	0.08	0.32	0.04	93.44	1220	192	0.0683	0.98	0.07846	1.33	0.7381	1.29	0.04706	1.17	877	40	486	12	561	11	929	21		
P9693-61	60.65	30.41	1.44	1.28	0.20	0.07	94.04	735	110	0.10375	1.07	0.21361	1.32	3.05438	1.34	0.06948	1.24	1692	39	1248	30	1421	21	1357	33		
<b>P9694</b>																											
P9694-6	64.40	31.77	1.65	0.10	0.24	0.01	98.17	1426	2331	0.08478	0.99	0.12327	1.20	1.44164	1.19	0.01182	1.10	1310	38	749	17	906	14	237	5		
P9694-13	58.76	30.36	2.41	0.16	0.29	0.03	92.02	8695	974	0.08984	1.00	0.24464	1.10	3.02513	1.09	0.26677	1.02	1422	38	1410	28	1413	17	4779	87		
P9694-14	65.51	33.08	1.39	0.08	0.00	0.00	100.05			0.11476	1.08	0.25443	1.32	4.02818	1.35	0.03459	1.24	1876	39	1461	34	1639	22	687	17		
P9694-15	62.75	31.34	1.38	0.16	0.17	0.04	95.84	5985	736	0.09266	0.99	0.13138	1.22	1.67962	1.20	0.03855	1.17	1480	38	795	18	1000	15	764	17		
P9694-17	66.23	32.40	1.62	0.19	0.03	0.00	100.47	1328	184	0.1618	0.98	0.25589	1.27	5.71312	1.24	0.10771	1.15	2474	33	1468	33	1933	21	2067	45		
P9694-18	65.19	32.53	1.20	0.25	0.04	0.00	99.21			0.11116	1.95	0.27916	1.46	4.29608	2.05	0.01771	2.09	1825	70	1587	41	1692	34	354	15		
P9694-19	60.66	30.53	1.51	0.57	0.08	0.05	93.40	740	104	0.16202	0.98	0.28097	1.26	6.28105	1.23	0.07261	1.17	2476	33	1596	36	2015	22	1416	32		
P9694-22	55.86	27.28	1.54	1.52	0.11	0.01	86.32			0.11368	1.03	0.27468	1.34	4.30633	1.33	0.07308	1.18	1859	37	1564	37	1694	22	1425	32		
P9694-23	65.40	32.87	1.32	0.05	0.02	0.00	99.66	308	49	0.1646	0.98	0.41166	1.29	9.35029	1.26	0.12726	1.17	2503	33	2222	49	2372	23	2421	53		
P9694-24	65.01	32.52	1.37	0.04	0.00	0.06	98.99	1844	246	0.16872	0.98	0.43644	1.30			0.13215	1.19	2545	33	2334	51	2449	23	2508	56		
P9694-26	65.86	32.69	1.34	0.08	0.01	0.09	100.06			0.12465	3.91	0.22624	1.98	3.88624	3.81	0.01798	4.06	2023	135	1314	47	1610	62	360	29		
P9694-27	65.27	32.58	1.74	0.11	0.02	0.01	99.72	776	115	0.11854	1.00	0.20929	1.37	3.42196	1.35	0.08136	1.23	1934	36	1225	31	1509	21	1580	37		
P9694-30	64.72	32.72	1.77	0.01	0.08	0.00	99.31	2441	188	0.1031	0.99	0.16591	1.34	2.35856	1.31	0.05117	1.25	1680	36	989	25	1230	19	1008	25		
P9694-36	65.96	33.03	1.31	0.07	0.06	0.02	100.45	143	23	0.11606	1.04	0.34019	1.33	5.44606	1.35	0.09729	1.20	1896	37	1887	43	1892	23	1876	43		
P9694-37	59.10	31.39	2.15	0.13	0.18	0.06	93.01	3273	528	0.10227	1.02	0.28367	1.28	3.99673	1.28	1.09447	1.17	1665	37	1609	37	1633	21				
P9694-38	66.01	32.97	1.10	0.02	0.01	0.00	100.10	309	43	0.11181	1.03	0.32916	1.30	5.07503	1.30	0.08585	1.16	1828	37	1834	41	1831	22	1664	37		
P9694-39	65.10	32.89	1.56	0.00	0.01	0.00	99.55	846	118	0.10373	1.00	0.19034	1.30	2.72248	1.29	0.0333	1.17	1691	37	1123	27	1334	19	662	15		
P9694-40	59.69	31.35	2.76	0.05	0.15	0.03	94.02	2798	427	0.09907	1.00	0.15567	1.30	2.12597	1.29	0.03291	1.15	1606	37	932	23	1157	18	654	15		
P9694-41	65.91	33.11	1.19	0.02	0.05	0.01	100.30	454	60	0.11278	1.01	0.30361	1.31	4.72037	1.30	0.04228	1.16	1844	36	1709	39	1770	22	837	19		
P9694-43	65.51	33.45	1.50	0.07	0.00	0.01	100.54	241	38	0.1179	1.20	0.32239	1.35	5.24129	1.45	0.08708	1.27	1924	43	1801	42	1859	25	1687	41		
P9694-53	62.52	31.75	1.51	0.11	0.17	0.04	96.09			0.10715	1.52	0.18103	1.38	2.67136	1.67	0.23997	1.30	1751	55	1072	27	1320	25	4347	102		
P9694-57	66.49	32.92	1.28	0.19	0.03	0.01	100.93	755	108	0.11371	1.05	0.2598	1.28	4.07078	1.29	0.02446	1.19	1859	38	1488	34	1648	21	488	11		
P9694-62	66.15	33.18	1.52	0.11	0.06	0.03	101.04	595	87	0.12278	0.98	0.35619	1.31	6.02971	1.28	0.10537	1.15	1997	35	1964	45	1980	22	2024	44		
<b>P9695</b>																											
P9695-3	66.10	33.21	1.31	0.06	0.02	0.04	100.73	414	68	0.11422	1.07	0.28309	1.15	4.45863	1.19	0.0743	1.08	1867	38	1606	33	1723	20	1448	30		
P9695-7	66.09	33.40	1.30	0.06	0.10	0.03	100.98	197	33	0.20164	1.00	0.32117	1.13	8.93075	1.12	0.17832	1.05	2839	33	1795	35	2330	21	3316	64		
P9695-9	67.08	32.85	1.37	0.11	0.00	0.05	101.45	549	84	0.11623	0.99	0.27905	1.12	4.47332	1.11	0.08582	1.04	1899	36	1586	31	1726	18	1664	33		
P9695-10	65.45	32.84	1.27	0.20	0.08	0.02	99.86	501	80	0.11773	0.99	0.28494	1.12	4.62649	1.10	0.08418	1.03	1922	35	1616	32	1754	18	1633	33		
P9695-11	65.75	33.20	1.27	0.08	0.00	0.03	100.33	226	37	0.11703	1.00	0.28775	1.11	4.64528	1.10	0.08519	1.03	1911	36	1630	32	1757	18	1652	33		
P9695-12	65.72	33.35	1.62	0.11	0.11	0.00	100.90	325	42	0.11774	1.01	0.28739	1.16	4.66654	1.16	0.08574	1.07	1922	36	1628	33	1761	19	1662	34		
P9695-14	64.92	33.23	1.45	0.13	0.01	0.01	99.75	585	88	0.11399	1.04	0.2914	1.17	4.58049	1.18	0.08577	1.13	1863	37	1648	34	1745	20	1663	36		
P9695-16	64.86	33.08	1.32	0.20	0.05	0.02	99.54	525	83	0.11284	1.00	0.30014	1.21	4.66928	1.20	0.09566	1.10	1845	36	1692	36	1761	20	1846	39		
P9695-17	66.20	32.93	1.35	0.07	0.06	0.02	100.62	308	46	0.16503	1.01	0.41083	1.17	9.35037	1.17	0.11016	1.09	2507	34	2218	44	2372	21	2112	44		
P9695-20	63.84	32.52	1.46	0.13	0.16	0.00	98.12	2457	347	0.09772	0.99	0.1468	1.24	1.9771	1.23	0.01819	1.10	1581	37	882	20	1107	17	364	8		
P9695-22	65.92	33.04	1.36	0.08	0.00	0.09	100.49	225	35	0.1162	1.03	0.2878	1.20	4.61144	1.20	0.08894	1.09	1898	37	1630	34	1751	20	1722	36		
P9695-24	65.74	32.77	1.72	0.02	0.00	0.06	100.31	293	54	0.11421	1.14	0.327	1.25	5.14403	1.34	0.09262	1.21	1867	41	1823	40	1843	23	1790	42		
P9695-26	62.65	31.59	1.51	0.24	0.05	0.11	96.14	866	137	0.11216	1.03	0.24292	1.19	3.75104	1.22	0.07342	1.16	1834	37	1401	30	1582	20	1432	32		
P9695-27	66.35	32.95	1.15	0.28	0.06	0.10	100.90	489	70	0.17451	1.07	0.46357	1.26			0.11263	1.15	2601	35	2455	51	2535	24	2157	47		
P9695-31	64.99	32.71	1.50	0.10	0.01	0.00	99.31	299	38	0.11851	1.03	0.28693	1.24	4.68271	1.25	0.07948	1.17	1933	37	1626	36	1764	21	1545	35		
P9695-37	65.75	32.81	1.51	0.14	0.00	0.06	100.26	451	75	0.11439	1.01	0.29777	1.25	4.68978	1.25	0.08638	1.11	1870	36	1680	37	1765	21	1674	36		

Sample#	EMP (wt. %)							MC-ICPMS		RATIOS								AGES (Ma)							
	ZrO <sub>2</sub>	SiO <sub>2</sub>	HfO <sub>2</sub>	Y <sub>2</sub> O <sub>3</sub>	U <sub>2</sub> O <sub>3</sub>	ThO <sub>2</sub>	Total	ppm Yb	ppm Lu	<sup>207</sup> Pb/ <sup>206</sup> Pb	R.S.D.	<sup>206</sup> Pb/ <sup>238</sup> U	R.S.D.	<sup>207</sup> Pb/ <sup>235</sup> U	R.S.D.	<sup>208</sup> Pb/ <sup>232</sup> Th	R.S.D.	<sup>207</sup> Pb/ <sup>206</sup> Pb ± 2 σ	<sup>206</sup> Pb/ <sup>238</sup> U ± 2 σ	<sup>207</sup> Pb/ <sup>235</sup> U ± 2 σ	<sup>208</sup> Pb/ <sup>232</sup> Th ± 2 σ				
P9695-40	64.50	33.16	1.61	0.09	0.02	0.00	99.38	1248	180	0.149	0.99	0.28936	1.22	5.93214	1.20	0.06635	1.12	2334	34	1638	35	1965	21	1298	28
P9695-42	66.20	32.11	1.41	0.03	0.04	0.00	99.78	203	34	0.11587	1.09	0.32333	1.24	5.15319	1.28	0.09242	1.15	1893	39	1805	39	1844	22	1786	39
P9695-50	65.86	32.58	1.18	0.25	0.02	0.00	99.89			0.11002	1.10	0.30013	1.29	4.54112	1.32	0.07476	1.22	1799	40	1691	38	1738	22	1457	34
P9695-51	63.78	31.92	1.55	0.29	0.16	0.03	97.73	1190	154	0.11212	0.98	0.17371	1.28	2.67942	1.24	0.01462	1.16	1834	35	1032	24	1322	18	293	7
P9695-52	65.12	32.82	1.77	0.02	0.02	0.01	99.75	74	9	0.11715	0.98	0.29616	1.25	4.77297	1.21	0.08643	1.12	1913	35	1672	37	1780	20	1675	36
P9695-53	53.35	32.93	1.22	0.27	0.02	0.03	87.82	1795	215	0.10787	1.01	0.18241	1.24	2.70435	1.23	0.04811	1.14	1763	37	1080	25	1329	18	949	21
P9695-54	65.86	32.59	1.46	0.08	0.12	0.00	100.12	3815	426	0.10656	0.99	0.18846	1.22	2.76205	1.19	0.03416	1.14	1741	36	1113	25	1345	18	678	15
P9695-57	65.71	32.92	1.34	0.07	0.11	0.02	100.18			0.16414	1.03	0.41836	1.18	9.47419	1.20	0.06489	1.14	2498	35	2253	45	2385	22	1270	28
P9695-59	65.64	32.94	1.38	0.13	0.05	0.05	100.19	199	32	0.11459	1.13	0.32724	1.22	5.17081	1.30	0.09666	1.18	1873	41	1824	39	1847	22	1864	42
P9695-65	65.85	32.91	1.57	0.06	0.07	0.01	100.46	282	44	0.1161	1.04	0.33323	1.17	5.33216	1.19	0.08913	1.10	1896	37	1854	38	1874	20	1725	36

# C, core; R, rim

\* 1 - euhedral to 5 -rounded

\*\*O-oscillatory; D-diffusive; L-laminated; N-no zoning; M-metamict. In order from less important to predominant.

*Rejected data are in Italic*

## Appendix 2. Zir

<sup>176</sup>Lu decav constant

Sample#	Lu-Hf isotopes				Blichert-Toft & Albarede 1997 (1.93x10 <sup>-11</sup> )				Scherer et al., 2001 (1.865x10 <sup>-11</sup> )				Bizzarro et al., 2003 (1.983x10 <sup>-11</sup> )				Morph.*	Zoning**	Length/width
	<sup>176</sup> Hf/ <sup>177</sup> Hf	± 2 SE	<sup>176</sup> Lu/ <sup>177</sup> Hf	<sup>176</sup> Yb/ <sup>177</sup> Hf	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>			
<b>P9686</b>																			
P9686-1	0.281900	0.000034	0.003002	0.114086	1.94	2.18	0.281811	0.82	2.01	2.28	0.281814	-0.26	1.89	2.10	0.281809	1.71	2	O	2
P9686-2	0.281779	0.000028	0.001304	0.044525	2.02	2.32	0.281740	-1.18	2.09	2.43	0.281741	-2.35	1.96	2.23	0.281739	-0.23	2	O	2
P9686-3	0.281820	0.000022	0.001332	0.042450	1.96	2.26	0.281781	-0.86	2.03	2.37	0.281782	-1.99	1.91	2.18	0.281780	0.05	3	O	3
P9686-4	0.281779	0.000028	0.003845	0.157963	2.16	2.53	0.281671	-5.93	2.24	2.65	0.281674	-6.93	2.10	2.45	0.281668	-5.11	2	OD	1
P9686-5	0.281879	0.000022	0.001601	0.055779	1.90	2.16	0.281833	0.64	1.96	2.26	0.281834	-0.46	1.84	2.08	0.281831	1.54	3	O	2
P9686-7	0.281861	0.000028	0.001332	0.049688	1.91	2.14	0.281821	1.53	1.97	2.25	0.281823	0.37	1.85	2.06	0.281820	2.47	2	OD	2
P9686-8	0.281841	0.000024	0.001245	0.038720	1.93	2.41	0.281813	-7.40	2.00	2.51	0.281814	-8.27	1.88	2.32	0.281812	-6.69	3	D	2
P9686-9	0.281827	0.000040	0.001143	0.037338	1.94	2.28	0.281796	-2.05	2.01	2.39	0.281797	-3.12	1.89	2.19	0.281795	-1.17	2	DO	2
P9686-11	0.281869	0.000022	0.001586	0.055826	1.91	2.21	0.281825	-1.04	1.97	2.32	0.281826	-2.09	1.86	2.13	0.281824	-0.17	2	DO	3
P9686-13	0.281802	0.000040	0.002029	0.067944	2.02	2.29	0.281739	-0.35	2.09	2.41	0.281741	-1.52	1.97	2.21	0.281738	0.60	3	DO	3
P9686-14	0.281872	0.000042	0.001759	0.059929	1.91	2.19	0.281822	-0.12	1.98	2.30	0.281824	-1.20	1.86	2.11	0.281820	0.77	2	DO	1
P9686-15	0.281884	0.000048	0.000744	0.026158	1.85	2.10	0.281863	1.33	1.91	2.21	0.281864	0.21	1.80	2.02	0.281863	2.24	1	DO	1
P9686-16	0.281850	0.000016	0.001039	0.025666	1.91	2.18	0.281820	0.19	1.97	2.29	0.281821	-0.93	1.86	2.10	0.281819	1.11	2	OD	2
P9686-17	0.281873	0.000046	0.003381	0.100944	2.00	2.26	0.281772	-0.31	2.07	2.36	0.281776	-1.39	1.94	2.17	0.281769	0.57	3	DO	2
P9686-20	0.281744	0.000144	0.000892	0.025196	2.04	2.39	0.281718	-2.68	2.11	2.50	0.281719	-3.83	1.98	2.30	0.281717	-1.74	2	DO	1
P9686-21	0.281831	0.000016	0.002151	0.082862	1.99	2.13	0.281757	4.80	2.06	2.24	0.281759	3.50	1.94	2.04	0.281755	5.87	2	DO	1
P9686-24																	3	O	3
P9686-26																	2	D	1
P9686-27																	2	DO	2
P9686-28																	2	DO	2
P9686-29																	2	D	3
P9686-33																	2	O	3
P9686-35	0.281824	0.000032	0.003191	0.121014	2.06	2.32	0.281725	-0.67	2.13	2.43	0.281729	-1.79	2.00	2.24	0.281723	0.25	3	DO	2
P9686-36	0.281972	0.000052	0.001478	0.055735	1.76	1.93	0.281928	4.69	1.82	2.03	0.281930	3.56	1.72	1.85	0.281927	5.62	3	DO	2
P9686-37	0.281867	0.000042	0.002084	0.080711	1.94	2.19	0.281806	0.59	2.00	2.30	0.281808	-0.52	1.88	2.11	0.281804	1.51	2	OD	2
P9686-38	0.281821	0.000024	0.001028	0.032529	1.94	2.26	0.281792	-1.33	2.01	2.37	0.281793	-2.44	1.89	2.18	0.281791	-0.43	2	DO	3
P9686-42	0.281815	0.000086	0.009079	0.356607	2.48	2.75	0.281540	-8.03	2.56	2.85	0.281549	-8.92	2.41	2.66	0.281532	-7.31	2	DO	1
P9686-43	0.281826	0.000030	0.001293	0.043338													3	DO	1
P9686-46	0.281839	0.000046	0.001622	0.059347	1.95	2.23	0.281791	-0.10	2.02	2.34	0.281792	-1.23	1.90	2.14	0.281789	0.82	3	DO	3
P9686-48	0.281835	0.000044	0.001648	0.063189	1.96	2.23	0.281786	0.00	2.03	2.34	0.281788	-1.14	1.90	2.15	0.281785	0.92	2	DO	2
P9686-50	0.281773	0.000032	0.001394	0.046445	2.03	2.36	0.281732	-2.18	2.10	2.47	0.281734	-3.31	1.97	2.27	0.281731	-1.25	3	OD	3
<b>P9687</b>																			
P9687-3	0.281889	0.000038	0.004294	0.139739	2.03	2.54	0.281810	-12.39	2.10	2.65	0.281813	-13.03	1.97	2.47	0.281808	-11.87	2	N	2
P9687-8	0.281789	0.000042	0.000654	0.020262	1.97	2.27	0.281769	-0.65	2.04	2.38	0.281770	-1.82	1.92	2.18	0.281769	0.31	3	DO	2
P9687-11	0.281798	0.000044	0.004722	0.196302	2.19	2.54	0.281664	-5.83	2.26	2.65	0.281669	-6.81	2.13	2.45	0.281660	-5.03	2	DO	2
P9687-16	0.281847	0.000042	0.000970	0.031815	1.91	2.14	0.281818	1.99	1.97	2.24	0.281819	0.80	1.86	2.05	0.281817	2.96	3	DO	4
P9687-17	0.281813	0.000034	0.001272	0.040805	1.97	2.21	0.281774	1.24	2.04	2.32	0.281775	0.04	1.91	2.12	0.281773	2.23	4	DO	3
P9687-18	0.281798	0.000020	0.001244	0.038508	1.99	2.24	0.281760	0.61	2.05	2.36	0.281761	-0.60	1.93	2.16	0.281759	1.59	2	DO	3
P9687-19	0.281289	0.000036	0.000603	0.018682	2.62	2.69	0.281259	5.11	2.71	2.84	0.281260	3.12	2.55	2.57	0.281258	6.74	2	OD	3
P9687-25	0.281833	0.000032	0.001259	0.040215	1.94	2.18	0.281794	1.29	2.01	2.29	0.281796	0.11	1.89	2.10	0.281793	2.26	2	DO	3
P9687-26	0.281821	0.000026	0.003021	0.101142	2.05	2.35	0.281732	-2.10	2.12	2.46	0.281735	-3.18	2.00	2.27	0.281729	-1.22	2	DO	2
P9687-27	0.281819	0.000028	0.000557	0.013873	1.92	2.16	0.281801	1.92	1.99	2.27	0.281802	0.69	1.87	2.07	0.281801	2.91	3	OD	3
P9687-28	0.281993	0.000024	0.000477	0.008586	1.69	1.75	0.281978	8.74	1.75	1.85	0.281979	7.50	1.64	1.68	0.281978	9.76	4	N	2
P9687-29	0.281911	0.000148	0.003895	0.161020	1.97	2.13	0.281784	3.43	2.04	2.24	0.281788	2.27	1.92	2.05	0.281780	4.38	2	DO	2
P9687-30	0.281843	0.000036	0.001061	0.030135	1.92	2.19	0.281812	0.33	1.98	2.30	0.281813	-0.81	1.87	2.11	0.281811	1.25	3	OD	2
P9687-33	0.281760	0.000030	0.001039	0.028190	2.03	2.34	0.281728	-1.47	2.10	2.45	0.281729	-2.65	1.97	2.25	0.281727	-0.51	2	DO	3
P9687-34	0.281801	0.000044	0.000764	0.019178	1.96	2.23	0.281778	0.46	2.03	2.34	0.281778	-0.73	1.91	2.14	0.281777	1.44	2	DO	3
P9687-35	0.281836	0.000074	0.002093	0.066860	1.98	2.23	0.281772	0.43	2.05	2.34	0.281774	-0.72	1.93	2.15	0.281770	1.37	2	OD	4

<sup>176</sup>Lu decav constant

Sample#	Lu-Hf isotopes				Blichert-Toft & Albarede 1997 (1.93x10 <sup>-11</sup> )				Scherer et al., 2001 (1.865x10 <sup>-11</sup> )				Bizzarro et al., 2003 (1.983x10 <sup>-11</sup> )				Morph.*	Zoning**	Length/width	
	<sup>176</sup> Hf/ <sup>177</sup> Hf	± 2 SE	<sup>176</sup> Lu/ <sup>177</sup> Hf	<sup>176</sup> Yb/ <sup>177</sup> Hf	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>				
P9687-36	0.281911	0.000040	0.001185	0.034806	1.83	2.02	0.281875	3.62	1.90	2.13	0.281876	2.45	1.78	1.94	0.281874	4.57	2	OD	3	
P9687-37	0.281632	0.000072	0.001395	0.035913	2.22	2.37	0.281577	3.68	2.30	2.49	0.281579	2.17	2.16	2.27	0.281576	4.92	1	O	3	
P9687-40	0.281214	0.000026	0.000575	0.017738	2.72	2.95	0.281187	-0.96	2.81	3.11	0.281188	-2.84	2.64	2.83	0.281186	0.57	3	DO	2	
P9687-42																				
P9687-43	0.281975	0.000028	0.000845	0.023914	1.73	1.57	0.281943	16.41	1.79	1.67	0.281944	14.87	1.68	1.49	0.281942	17.66	4	O	3	
P9687-44																		3	DO	3
P9687-45																		4	O	3
P9687-46																		3	OD	3
P9687-47																		3	DO	3
P9687-48																		2	OD	4
P9687-49	0.281720	0.000064	0.001516	0.048720	2.11	2.27	0.281665	3.41	2.18	2.39	0.281667	2.02	2.05	2.18	0.281664	4.55	2	OD	2	
P9687-50																		2	DO	3
P9687-51	0.281841	0.000220	0.001654	0.052186	1.95	2.16	0.281789	2.16	2.02	2.27	0.281791	0.96	1.90	2.08	0.281788	3.14	4	DO	3	
P9687-52																		3	DO	3
P9687-53																		3	DO	3
P9687-54	0.282040	0.000180	0.001137	0.034284	1.66	1.76	0.282007	7.22	1.71	1.86	0.282008	6.09	1.61	1.69	0.282006	8.15	4	DO	3	
P9687-55	0.281910	0.000082	0.001267	0.038376	1.84	1.99	0.281871	4.97	1.90	2.09	0.281872	3.75	1.79	1.91	0.281870	5.96	3	DO	2	
P9687-56																		4	OD	3
P9687-59	0.281544	0.000050	0.000640	0.017571	2.29	2.55	0.281520	-0.16	2.37	2.68	0.281521	-1.65	2.23	2.44	0.281519	1.06	4	O	3	
P9687-60	0.281807	0.000040	0.001050	0.031023	1.96	2.28	0.281777	-1.34	2.03	2.39	0.281778	-2.46	1.91	2.19	0.281776	-0.42	3	DO	3	
P9687-63																		3	DO	2
<b>P9688</b>																				
P9688-2	0.281847	0.000028	0.000844	0.028433	1.90	2.06	0.281820	4.67	1.97	2.17	0.281821	3.38	1.85	1.97	0.281819	5.71	3	DO	2	
P9688-4	0.281779	0.000058	0.000463	0.011031	1.97	2.27	0.281765	-0.70	2.04	2.39	0.281766	-1.88	1.92	2.19	0.281765	0.27	3	DL	3	
P9688-5	0.281933	0.000056	0.001049	0.029090	1.80	1.98	0.281902	3.94	1.86	2.08	0.281903	2.78	1.75	1.90	0.281901	4.88	3	OD	3	
P9688-6	0.281662	0.000050	0.000793	0.019294	2.14	2.41	0.281635	-0.27	2.22	2.54	0.281636	-1.61	2.09	2.32	0.281634	0.83	5	O	2	
P9688-7	0.281822	0.000030	0.001170	0.037094	1.95	2.23	0.281787	0.07	2.02	2.34	0.281788	-1.09	1.90	2.14	0.281786	1.01	3	OD	3	
P9688-8																		3	DL	3
P9688-10	0.281774	0.000038	0.001515	0.047570	2.03	2.36	0.281729	-2.20	2.10	2.47	0.281731	-3.34	1.98	2.27	0.281728	-1.28	4	OD	2	
P9688-11																		4	OD	3
P9688-12																		4	OD	2
P9688-13	0.281853	0.000080	0.003765	0.147098	2.05	2.23	0.281726	2.53	2.12	2.34	0.281730	1.32	1.99	2.14	0.281722	3.51	3	O	3	
P9688-14	0.282046	0.000096	0.003569	0.145230	1.76	1.89	0.281940	5.55	1.82	1.98	0.281944	4.48	1.71	1.82	0.281937	6.42	2	OD	3	
P9688-16	0.281658	0.000082	0.003804	0.171094	2.33	2.73	0.281542	-7.71	2.41	2.86	0.281546	-8.80	2.27	2.64	0.281539	-6.82	3	OD	2	
P9688-17	0.281952	0.000042	0.003045	0.106953	1.87	2.01	0.281855	4.73	1.93	2.11	0.281859	3.57	1.82	1.94	0.281853	5.68	2	OD	5	
P9688-18	0.281912	0.000032	0.002955	0.097926	1.92	2.10	0.281819	3.16	1.99	2.20	0.281822	2.01	1.87	2.02	0.281817	4.10	4	OD	2	
P9688-19	0.281951	0.000054	0.002073	0.056333	1.82	2.16	0.281901	-2.13	1.88	2.25	0.281902	-3.05	1.77	2.08	0.281899	-1.38	2	D	1	
P9688-20	0.281873	0.000064	0.001482	0.051025	1.90	2.16	0.281830	0.67	1.96	2.27	0.281832	-0.44	1.85	2.08	0.281829	1.58	2	OD	3	
P9688-21	0.282207	0.000080	0.005444	0.231230	1.61	1.64	0.282041	10.05	1.67	1.72	0.282046	9.02	1.57	1.58	0.282036	10.90	4	LD	4	
P9688-23	0.281930	0.000044	0.002762	0.103307	1.88	2.08	0.281847	2.64	1.95	2.19	0.281850	1.53	1.83	2.00	0.281845	3.55	2	D	3	
P9688-25	0.281916	0.000044	0.002944	0.104222	1.91	2.11	0.281826	2.71	1.98	2.21	0.281829	1.57	1.86	2.03	0.281823	3.63	4	DL	3	
P9688-26																		3	DO	3
P9688-27																		2	DO	2
P9688-28	0.282041	0.000062	0.004817	0.201726	1.83	1.96	0.281894	4.82	1.90	2.06	0.281899	3.77	1.78	1.89	0.281890	5.68	2	OD	2	
P9688-31	0.281950	0.000084	0.004307	0.150559	1.94	2.14	0.281820	1.80	2.01	2.24	0.281825	0.74	1.89	2.06	0.281817	2.66	4	DL	3	
P9688-32	0.281820	0.000044	0.001125	0.032780	1.95	2.29	0.281789	-2.12	2.02	2.40	0.281790	-3.20	1.90	2.20	0.281788	-1.24	2	DO	4	
P9688-35	0.281803	0.000046	0.001649	0.064829	2.00	2.21	0.281749	2.12	2.07	2.32	0.281751	0.87	1.95	2.13	0.281747	3.14	3	OLD	4	
P9688-36	0.281793	0.000030	0.002602	0.120460	2.07	2.30	0.281708	0.59	2.14	2.42	0.281711	-0.62	2.01	2.22	0.281705	1.58	4	DO	3	
P9688-37	0.281779	0.000020	0.001314	0.046183	2.01	2.45	0.281746	-6.11	2.09	2.56	0.281747	-7.10	1.96	2.36	0.281745	-5.30	2	OD	3	
P9688-39	0.281790	0.000042	0.003874	0.163232	2.15	2.40	0.281664	-0.86	2.22	2.51	0.281668	-2.02	2.09	2.31	0.281660	0.09	3	DO	3	
P9688-40	0.281798	0.000094	0.001715	0.067498	2.01	2.29	0.281746	-0.27	2.08	2.40	0.281747	-1.44	1.96	2.20	0.281744	0.69	3	OD	3	

176Lu decav constant

Sample#	Lu-Hf isotopes				Blichert-Toft & Albarede 1997 (1.93x10 <sup>-11</sup> )				Scherer et al., 2001 (1.865x10 <sup>-11</sup> )				Bizzarro et al., 2003 (1.983x10 <sup>-11</sup> )				Morph.*	Zoning**	Length/width
	<sup>176</sup> Hf/ <sup>177</sup> Hf	± 2 SE	<sup>176</sup> Lu/ <sup>177</sup> Hf	<sup>176</sup> Yb/ <sup>177</sup> Hf	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>			
P9688-41																	4	L	2
P9688-42	0.281840	0.000048	0.001343	0.044220	1.93	2.22	0.281801	-0.13	2.00	2.32	0.281802	-1.25	1.88	2.13	0.281800	0.79	3	OD	3
P9688-43	0.281792	0.000026	0.001435	0.045947	2.00	2.33	0.281750	-2.06	2.07	2.44	0.281751	-3.18	1.95	2.24	0.281749	-1.15	2	OD	3
P9688-44	0.281760	0.000046	0.001191	0.035122	2.03	2.36	0.281725	-2.11	2.10	2.48	0.281726	-3.26	1.98	2.27	0.281724	-1.16	3	OD	3
P9688-45	0.281765	0.000024	0.003235	0.127557	2.14	2.32	0.281649	2.63	2.22	2.43	0.281653	1.31	2.09	2.23	0.281645	3.70	4	OD	3
P9688-46	0.281751	0.000028	0.001748	0.048149	2.08	2.36	0.281695	-0.82	2.15	2.48	0.281697	-2.03	2.02	2.27	0.281694	0.17	4	OLD	3
P9688-47	0.281780	0.000018	0.001228	0.044713	2.01	2.47	0.281749	-7.10	2.08	2.58	0.281750	-8.06	1.96	2.39	0.281748	-6.32	3	D	2
P9688-49	0.281728	0.000054	0.005718	0.207770	2.36	2.69	0.281547	-6.21	2.44	2.80	0.281553	-7.27	2.30	2.60	0.281542	-5.35	4	L	3
P9688-50	0.281736	0.000034	0.001762	0.054022	2.10	2.43	0.281683	-2.94	2.17	2.55	0.281685	-4.09	2.04	2.35	0.281681	-2.00	3	O	2
P9688-51	0.281944	0.000026	0.001251	0.035291	1.79	1.92	0.281905	5.82	1.85	2.02	0.281907	4.62	1.74	1.84	0.281904	6.81	3	DO	2
P9688-51-rim																			
P9688-53	0.281877	0.000032	0.001739	0.051250	1.91	2.11	0.281823	2.83	1.97	2.21	0.281825	1.64	1.85	2.02	0.281821	3.79	3	OLD	2
P9688-54	0.281839	0.000042	0.001429	0.043898	1.94	2.16	0.281795	2.09	2.01	2.27	0.281796	0.89	1.89	2.08	0.281794	3.07	4	LD	4
<b>P9689</b>																			
P9689-13	0.281843	0.000056	0.002037	0.075731	1.97	2.05	0.281770	6.83	2.04	2.16	0.281772	5.47	1.91	1.97	0.281767	7.95	4	DO	3
P9689-14	0.281625	0.000068	0.000870	0.027018	2.20	2.48	0.281595	-1.01	2.27	2.61	0.281596	-2.37	2.14	2.39	0.281594	0.10	4	DO	3
P9689-20																	3	DN	3
P9689-29	0.281873	0.000074	0.000824	0.026632	1.86	0.97	0.281822	39.46	1.93	1.08	0.281824	36.98	1.81	0.88	0.281820	41.50	5	ON	1
P9689-30																	4	O	3
P9689-33	0.281933	0.000056	0.001740	0.054219	1.83	1.95	0.281877	6.00	1.89	2.05	0.281879	4.78	1.78	1.87	0.281876	7.00	4	DN	3
P9689-35																	5	DN	2
P9689-36	0.281733	0.000054	0.007381	0.021220	2.47	2.71	0.281465	-3.66	2.56	2.83	0.281475	-4.80	2.41	2.62	0.281458	-2.73	5	DON	2
P9689-37	0.281665	0.000038	0.001252	0.038208	2.16	2.38	0.281620	1.48	2.24	2.50	0.281622	0.08	2.11	2.29	0.281619	2.62	4	DO	3
P9689-39	0.282132	0.000058	0.002578	0.077358	1.59	1.46	0.282040	16.04	1.65	1.55	0.282043	14.71	1.55	1.40	0.282038	17.13	3	OD	3
P9689-42	0.281227	0.000072	0.000191	0.006968	2.67	2.83	0.281217	2.20	2.77	2.98	0.281218	0.23	2.60	2.70	0.281217	3.80	5	ON	2
P9689-43	0.281673	0.000260	0.003367	0.129809	2.28	2.30	0.281524	8.00	2.36	2.43	0.281529	6.38	2.22	2.21	0.281519	9.32	4	OD	3
P9689-44	0.281803	0.000064	0.001272	0.037491	1.98	2.08	0.281757	6.50	2.05	2.19	0.281759	5.09	1.93	1.99	0.281756	7.64	4	DO	3
P9689-44R																			
P9689-46	0.281780	0.000106	0.003171	0.112259	2.12	2.39	0.281679	-1.34	2.19	2.51	0.281683	-2.50	2.06	2.31	0.281676	-0.39	3	OD	3
P9689-48	0.281773	0.000078	0.001016	0.003034	2.01	2.17	0.281738	3.89	2.08	2.29	0.281739	2.54	1.95	2.09	0.281737	4.99	5	OD	2
P9689-50	0.281991	0.000076	0.001697	0.047539	1.75	1.82	0.281937	8.09	1.81	1.92	0.281939	6.86	1.70	1.74	0.281935	9.09	1	OD	2
P9689-51	0.281736	0.000046	0.001650	0.050634	2.09	2.28	0.281678	2.59	2.16	2.40	0.281680	1.24	2.04	2.19	0.281676	3.69	4	ODL	3
P9689-53	0.281386	0.000080	0.003817	0.142543	2.72	2.92	0.281208	-0.61	2.81	3.06	0.281214	-2.29	2.65	2.81	0.281203	0.75	4	OD	3
P9689-57	0.281784	0.000072	0.000775	0.021842	1.98	1.83	0.281751	15.14	2.05	1.94	0.281752	13.41	1.93	1.74	0.281750	16.55	5	DO	3
P9689-58	0.281312	0.000050	0.001299	0.044361	2.64	2.72	0.281247	4.71	2.73	2.87	0.281249	2.76	2.57	2.60	0.281245	6.31	4	D	2
P9689-59	0.281621	0.000078	0.001764	0.057983	2.25	2.45	0.281554	1.61	2.33	2.58	0.281556	0.15	2.19	2.36	0.281552	2.80	5	DO	3
P9689-60	0.281932	0.000052	0.007661	0.340413	2.18	2.31	0.281661	2.27	2.25	2.41	0.281670	1.17	2.12	2.23	0.281653	3.16	4	DO	3
P9689-63	0.281277	0.000052	0.001697	0.057884	2.71	2.83	0.281192	2.90	2.81	2.99	0.281195	0.96	2.64	2.71	0.281190	4.48	4	DO	3
P9689-64	0.281565	0.000096	0.000675	0.020765	2.26	2.43	0.281539	3.00	2.34	2.56	0.281539	1.43	2.20	2.33	0.281538	4.29	5	DO	3
<b>P9690</b>																			
P9690-1	0.282258	0.000036	0.006323	0.245614	1.58	1.46	0.282026	16.79	1.63	1.54	0.282034	15.58	1.54	1.40	0.282019	17.77	3	N	2
P9690-2	0.281987	0.000040	0.001978	0.074435	1.77	1.82	0.281922	8.77	1.83	1.92	0.281924	7.52	1.72	1.74	0.281920	9.79	3	DO	3
P9690-3	0.281907	0.000040	0.001194	0.037070	1.84	2.02	0.281871	3.79	1.90	2.13	0.281872	2.62	1.79	1.94	0.281870	4.76	4	DOL	3
P9690-5	0.281872	0.000032	0.001719	0.066152	1.91	2.12	0.281819	2.57	1.98	2.22	0.281821	1.39	1.86	2.04	0.281817	3.53	3	OD	3
P9690-6	0.281881	0.000024	0.001339	0.048737	1.88	1.98	0.281836	6.61	1.94	2.09	0.281837	5.31	1.83	1.90	0.281834	7.68	3	DO	3
P9690-7	0.281648	0.000062	0.000875	0.028021	2.17	2.46	0.281618	-1.10	2.24	2.58	0.281619	-2.43	2.11	2.36	0.281618	-0.02	5	O	3
P9690-9	0.281870	0.000046	0.002285	0.081277	1.94	2.20	0.281803	0.35	2.01	2.31	0.281805	-0.76	1.89	2.12	0.281801	1.25	3	OD	2
P9690-10	0.281809	0.000038	0.001462	0.048576	1.98	2.27	0.281765	-0.53	2.05	2.38	0.281767	-1.68	1.93	2.18	0.281764	0.41	2	D	2
P9690-12	0.281305	0.000034	0.000752	0.026959	2.61	2.73	0.281269	3.33	2.70	2.88	0.281270	1.42	2.54	2.62	0.281268	4.89	5	OD	2
P9690-13	0.281856	0.000034	0.001331	0.048136	1.91	2.11	0.281814	3.19	1.98	2.21	0.281815	1.97	1.86	2.02	0.281813	4.18	2	OD	2

<sup>176</sup>Lu decay constant

Sample#	Lu-Hf isotopes				Blichert-Toft & Albarede 1997 (1.93x10 <sup>-11</sup> )				Scherer et al., 2001 (1.865x10 <sup>-11</sup> )				Bizzarro et al., 2003 (1.983x10 <sup>-11</sup> )				Morph.*	Zoning**	Length/width
	<sup>176</sup> Hf/ <sup>177</sup> Hf	± 2 SE	<sup>176</sup> Lu/ <sup>177</sup> Hf	<sup>176</sup> Yb/ <sup>177</sup> Hf	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>			
P9690-14	0.281896	0.000038	0.002666	0.096046	1.93	2.16	0.281817	1.02	1.99	2.27	0.281820	-0.08	1.88	2.08	0.281815	1.92	4	OD	2
P9690-15	0.281887	0.000038	0.003427	0.108277	1.98	2.34	0.281800	-4.50	2.05	2.44	0.281803	-5.41	1.93	2.26	0.281797	-3.75	2	OD	4
P9690-17	0.281571	0.000320	0.002877	0.099990	2.39	2.77	0.281473	-6.04	2.48	2.90	0.281477	-7.30	2.33	2.67	0.281470	-5.02	5	DO	3
P9690-18	0.281843	0.000034	0.001952	0.072481	1.96	2.12	0.281777	4.29	2.03	2.23	0.281780	3.01	1.91	2.03	0.281776	5.33	3	OD	3
P9690-19	0.281866	0.000028	0.002226	0.076253	1.95	2.24	0.281803	-1.02	2.01	2.35	0.281805	-2.08	1.89	2.16	0.281801	-0.15	2	OD	3
P9690-20	0.281917	0.000048	0.002644	0.087087	1.90	2.15	0.281841	0.63	1.96	2.25	0.281844	-0.43	1.85	2.07	0.281839	1.49	5	L	4
P9690-21	0.281307	0.000026	0.000763	0.027956	2.61	2.86	0.281273	-1.23	2.70	3.01	0.281275	-2.98	2.54	2.75	0.281272	0.20	4	DO	2
P9690-23	0.281799	0.000020	0.001377	0.045564	1.99	2.32	0.281759	-1.99	2.06	2.43	0.281761	-3.10	1.94	2.23	0.281758	-1.08	3	OD	2
P9690-25	0.281776	0.000032	0.000688	0.020000	1.99	2.29	0.281756	-1.00	2.06	2.41	0.281756	-2.17	1.93	2.21	0.281755	-0.04	4	OD	3
P9690-27	0.281850	0.000054	0.001401	0.043901	1.92	2.14	0.281807	2.13	1.99	2.25	0.281808	0.94	1.87	2.06	0.281806	3.11	2	DO	2
P9690-28	0.281983	0.000044	0.008126	0.317168	2.12	2.30	0.281726	0.12	2.20	2.39	0.281735	-0.84	2.07	2.22	0.281719	0.90	4	OD	3
P9690-29	0.281627	0.000038	0.001130	0.036232	2.21	2.55	0.281590	-3.11	2.29	2.67	0.281591	-4.39	2.15	2.45	0.281589	-2.06	4	OD	3
P9690-30	0.281626	0.000038	0.000921	0.029180	2.20	2.47	0.281594	-0.36	2.27	2.59	0.281595	-1.74	2.14	2.37	0.281593	0.77	3	DO	4
P9690-31	0.282366	0.000030	0.000025	0.000946	1.18	1.60	0.282366	-2.18	1.22	1.67	0.282366	-2.60	1.15	1.55	0.282366	-1.85	5	N	1
P9690-32	0.281865	0.000064	0.001191	0.036113	1.89	1.92	0.281822	9.29	1.96	2.03	0.281823	7.87	1.84	1.84	0.281820	10.46	3	OD	3
P9690-33	0.281780	0.000048	0.000693	0.023011	1.98	2.21	0.281758	1.69	2.05	2.33	0.281759	0.43	1.93	2.13	0.281757	2.72	2	DO	2
P9690-34	0.281888	0.000044	0.001509	0.046599	1.88	2.07	0.281841	3.47	1.94	2.17	0.281843	2.28	1.83	1.98	0.281840	4.45	4	OD	2
P9690-35																	4	N	2
P9690-36	0.281860	0.000032	0.000957	0.026537	1.89	2.12	0.281831	1.97	1.95	2.23	0.281832	0.80	1.84	2.04	0.281830	2.93	4	D	2
P9690-37																	5	D	2
P9690-38	0.281872	0.000034	0.002294	0.088062	1.94	2.06	0.281794	5.46	2.01	2.17	0.281796	4.18	1.89	1.98	0.281792	6.50	2	DO	2
P9690-41	0.281766	0.000100	0.001878	0.057804	2.06	2.29	0.281704	1.11	2.14	2.41	0.281706	-0.15	2.01	2.21	0.281702	2.14	5	L	3
P9690-42																	5	ODN	2
P9690-44																	4	OD	2
P9690-45	0.281866	0.000042	0.001629	0.058318	1.91	2.11	0.281815	3.03	1.98	2.22	0.281817	1.83	1.86	2.03	0.281813	4.01	4	D	2
P9690-46	0.281851	0.000026	0.000871	0.029718	1.90	2.11	0.281824	2.68	1.96	2.22	0.281825	1.47	1.85	2.03	0.281823	3.67	4	OD	2
P9690-47	0.281931	0.000040	0.003136	0.118614	1.90	2.05	0.281830	4.59	1.97	2.15	0.281833	3.41	1.85	1.97	0.281827	5.56	4	OD	2
P9690-48	0.281293	0.000040	0.000676	0.020107	2.62	2.75	0.281261	2.99	2.71	2.91	0.281262	1.07	2.55	2.63	0.281260	4.55	5	ON	3
P9690-49	0.281899	0.000034	0.001200	0.037871	1.85	2.04	0.281863	3.50	1.91	2.14	0.281864	2.33	1.80	1.96	0.281862	4.47	3	DO	3
P9690-50	0.281865	0.000080	0.002507	0.082449	1.96	2.15	0.281784	2.82	2.03	2.26	0.281787	1.62	1.91	2.07	0.281782	3.80	3	D	2
<b>P9691</b>																			
P9691-1	0.282166	0.000060	0.005293	0.170072	1.67	1.70	0.281999	9.83	1.73	1.78	0.282004	8.76	1.62	1.63	0.281994	10.71	2	OD	4
P9691-2	0.282116	0.000044	0.004671	0.182251	1.71	1.81	0.281977	6.94	1.77	1.90	0.281981	5.91	1.67	1.74	0.281973	7.79	4	M	3
P9691-4	0.281991	0.000046	0.002313	0.074210	1.78	1.97	0.281926	3.20	1.84	2.07	0.281928	2.14	1.73	1.90	0.281924	4.06	4	L	4
P9691-5	0.282072	0.000044	0.003699	0.142118	1.73	1.93	0.281974	2.79	1.79	2.02	0.281978	1.85	1.68	1.86	0.281972	3.56	3	M	3
P9691-6	0.281771	0.000024	0.001674	0.063586	2.05	2.30	0.281718	0.21	2.12	2.42	0.281719	-1.01	1.99	2.22	0.281716	1.21	5	O	2
P9691-8	0.281862	0.000104	0.002303	0.086380	1.95	2.24	0.281796	-0.68	2.02	2.34	0.281798	-1.75	1.90	2.16	0.281794	0.21	5	L	3
P9691-9	0.281975	0.000034	0.002367	0.076110	1.80	1.95	0.281903	4.97	1.86	2.05	0.281906	3.83	1.75	1.87	0.281901	5.89	3	D	3
P9691-10	0.281311	0.000022	0.000260	0.008718	2.57	2.69	0.281299	3.49	2.66	2.85	0.281299	1.58	2.50	2.58	0.281298	5.05	5	N	2
P9691-11	0.281884	0.000044	0.000982	0.031505	1.86	2.09	0.281855	1.93	1.92	2.20	0.281856	0.79	1.81	2.01	0.281854	2.87	3	OD	3
P9691-13	0.281592	0.000036	0.000467	0.014797	2.22	2.64	0.281577	-5.77	2.29	2.76	0.281578	-7.00	2.16	2.54	0.281577	-4.76	5	N	2
P9691-14	0.281550	0.000046	0.000639	0.020488	2.28	2.71	0.281529	-6.30	2.36	2.84	0.281530	-7.57	2.22	2.61	0.281529	-5.27	4	OD	2
P9691-15	0.281738	0.000078	0.004374	0.159658	2.25	2.65	0.281614	-7.78	2.33	2.77	0.281619	-8.77	2.19	2.56	0.281611	-6.98	3	OD	2
P9691-17	0.282037	0.000032	0.002411	0.069490	1.72	1.87	0.281968	4.99	1.78	1.97	0.281971	3.93	1.67	1.80	0.281967	5.86	3	D	3
P9691-18	0.281982	0.000040	0.002421	0.079056	1.79	1.95	0.281910	4.59	1.86	2.05	0.281912	3.48	1.75	1.88	0.281908	5.50	4	DL	-
P9691-19	0.282015	0.000088	0.008569	0.321353	2.10	2.25	0.281740	1.21	2.18	2.35	0.281749	0.25	2.05	2.18	0.281732	1.99	2	LO	2
P9691-19R																			
P9691-20	0.281992	0.000042	0.003912	0.161334	1.86	1.99	0.281869	4.87	1.92	2.09	0.281874	3.76	1.81	1.92	0.281866	5.78	4	DO	2
P9691-21	0.281994	0.000032	0.001958	0.068446	1.76	1.92	0.281937	4.78	1.82	2.01	0.281939	3.67	1.71	1.84	0.281935	5.68	3	D	2
P9691-22	0.281952	0.000040	0.002454	0.090603	1.84	2.01	0.281878	3.88	1.90	2.11	0.281880	2.75	1.79	1.93	0.281876	4.80	3	DO	2
P9691-22R																			

<sup>176</sup>Lu decav constant

Sample#	Lu-Hf isotopes				Blichert-Toft & Albarede 1997 (1.93x10 <sup>11</sup> )				Scherer et al., 2001 (1.865x10 <sup>11</sup> )				Bizzarro et al., 2003 (1.983x10 <sup>11</sup> )				Morph.*	Zoning**	Length/width
	<sup>176</sup> Hf/ <sup>177</sup> Hf	± 2 SE	<sup>176</sup> Lu/ <sup>177</sup> Hf	<sup>176</sup> Yb/ <sup>177</sup> Hf	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>			
P9691-23	0.281985	0.000042	0.004363	0.159662	1.89	2.09	0.281857	2.03	1.96	2.19	0.281862	1.01	1.84	2.01	0.281854	2.86	3	DO	4
P9691-24	0.281795	0.000064	0.003674	0.163408	2.13	2.42	0.281682	-2.48	2.20	2.53	0.281686	-3.58	2.07	2.34	0.281679	-1.58	4	DO	3
P9691-25	0.281776	0.000064	0.004141	0.159103	2.18	2.46	0.281643	-2.35	2.26	2.58	0.281648	-3.48	2.12	2.38	0.281640	-1.43	2	D	3
P9691-26	0.282124	0.000028	0.003546	0.129332	1.65	1.54	0.281995	15.29	1.70	1.63	0.281999	13.98	1.60	1.47	0.281991	16.36	2	DL	3
P9691-27	0.281890	0.000034	0.002005	0.071638	1.90	2.11	0.281829	2.54	1.97	2.21	0.281831	1.38	1.85	2.03	0.281827	3.48	3	OD	2
P9691-28	0.281974	0.000048	0.002370	0.073451	1.80	1.95	0.281902	5.14	1.87	2.05	0.281904	4.00	1.76	1.87	0.281899	6.08	3	D	4
P9691-30	0.282009	0.000028	0.003498	0.110002	1.81	2.02	0.281911	2.31	1.87	2.11	0.281915	1.31	1.76	1.94	0.281909	3.13	4	M	3
P9691-31	0.281755	0.000062	0.001647	0.055935	2.07	2.34	0.281702	-0.24	2.14	2.45	0.281704	-1.46	2.01	2.25	0.281701	0.76	4	ON	4
P9691-32	0.281944	0.000044	0.001026	0.031892	1.78	1.74	0.281907	12.15	1.84	1.84	0.281908	10.73	1.73	1.66	0.281906	13.32	5	O	3
P9691-33	0.281962	0.000044	0.002941	0.097922	1.85	2.15	0.281887	-1.21	1.91	2.24	0.281889	-2.14	1.80	2.07	0.281884	-0.44	3	OM	-
P9691-34	0.282216	0.000088	0.005000	0.204395	1.58	1.54	0.282053	12.83	1.63	1.63	0.282059	11.72	1.54	1.48	0.282049	13.75	4	L	3
P9691-35	0.282190	0.000064	0.004949	0.171454	1.62	1.61	0.282030	11.67	1.67	1.69	0.282036	10.56	1.57	1.54	0.282026	12.57	3	D	2
P9691-36	0.282029	0.000132	0.006261	0.227102	1.93	2.07	0.281832	3.79	2.00	2.16	0.281838	2.76	1.88	2.00	0.281826	4.63	4	MD	3
P9691-37	0.282020	0.000034	0.002851	0.104639	1.76	1.85	0.281930	7.44	1.82	1.94	0.281933	6.27	1.72	1.77	0.281927	8.39	3	D	3
P9691-38	0.282148	0.000036	0.003219	0.106832	1.60	1.61	0.282049	10.70	1.65	1.70	0.282052	9.57	1.56	1.55	0.282046	11.61	4	D	2
P9691-39	0.281829	0.000036	0.000876	0.026584	1.93	2.03	0.281798	6.52	1.99	2.14	0.281800	5.15	1.87	1.94	0.281798	7.64	5	ON	2
P9691-40	0.282206	0.000030	0.004483	0.192928	1.57	1.53	0.282061	12.87	1.63	1.62	0.282066	11.74	1.53	1.47	0.282057	13.80	3	M	2
P9691-41	0.281686	0.000032	0.001288	0.049582	2.14	2.40	0.281642	-0.18	2.21	2.52	0.281644	-1.49	2.08	2.31	0.281641	0.89	4	O	3
P9691-42	0.281602	0.000040	0.002160	0.087443	2.30	2.78	0.281539	-9.25	2.38	2.91	0.281541	-10.35	2.24	2.68	0.281537	-8.35	4	DO	3
P9691-43																	5	ON	2
P9691-43R	0.281582	0.000032	0.000498	0.015058	2.23	2.57	0.281565	-2.69	2.31	2.69	0.281566	-4.04	2.17	2.47	0.281565	-1.59			
P9691-44	0.281994	0.000054	0.001228	0.034947	1.72	1.87	0.281958	5.40	1.78	1.97	0.281959	4.27	1.68	1.80	0.281957	6.32	4	OD	2
P9691-45	0.283004	0.000048	0.000809	0.022820	0.34	0.30	0.282998	17.19	0.35	0.32	0.282998	16.88	0.33	0.28	0.282997	17.43	4	N	3
P9691-46	0.281905	0.000042	0.000973	0.029102	1.83	1.97	0.281874	5.53	1.89	2.07	0.281875	4.29	1.78	1.89	0.281873	6.55	5	OD	2
P9691-47	0.281280	0.000048	0.002660	0.098255	2.78	3.05	0.281157	-2.97	2.88	3.20	0.281162	-4.70	2.71	2.93	0.281154	-1.57	5	DO	2
P9691-48	0.282198	0.000072	0.007411	0.262785	1.73	1.77	0.281963	8.70	1.79	1.85	0.281971	7.70	1.68	1.71	0.281956	9.51	2	ML	4
P9691-49	0.281904	0.000060	0.003934	0.140451	1.98	2.18	0.281780	1.91	2.05	2.29	0.281784	0.80	1.93	2.10	0.281777	2.83	4	OD	2
P9691-50																	4	OD	2
P9691-51	0.282068	0.000044	0.003138	0.099946	1.71	1.79	0.281972	7.54	1.77	1.89	0.281976	6.43	1.66	1.72	0.281970	8.45	3	OM	3
P9691-52	0.282068	0.000056	0.003412	0.119642	1.72	1.73	0.281954	10.36	1.78	1.83	0.281958	9.15	1.68	1.66	0.281951	11.35	4	L	3
P9691-53	0.282043	0.000046	0.005498	0.230698	1.87	2.01	0.281876	4.00	1.93	2.10	0.281882	2.98	1.82	1.94	0.281871	4.84	3	D	2
P9691-54	0.282108	0.000076	0.006055	0.210529	1.80	1.89	0.281919	6.49	1.86	1.98	0.281926	5.47	1.75	1.82	0.281914	7.33	4	DM	3
P9691-55	0.281903	0.000028	0.001981	0.073847	1.88	2.10	0.281844	2.28	1.95	2.20	0.281846	1.14	1.83	2.02	0.281842	3.20	5	D	2
P9691-56	0.281280	0.000044	0.000994	0.030945	2.66	2.87	0.281234	-0.10	2.75	3.03	0.281236	-1.92	2.59	2.76	0.281233	1.39	5	DN	2
P9691-57	0.282331	0.000054	0.004951	0.214570	1.40	1.38	0.282189	13.04	1.45	1.45	0.282194	12.06	1.37	1.32	0.282185	13.84	2	M	-
<b>P9692</b>																			
P9692-2	0.282138	0.000084	0.005135	0.181104	1.70	1.74	0.281974	9.35	1.76	1.83	0.281979	8.26	1.66	1.67	0.281969	10.24	1	D	2
P9692-3	0.280866	0.000440	0.005288	0.241733													3	OD	2
P9692-8	0.281905	0.000034	0.003124	0.111641	1.94	2.18	0.281814	0.50	2.01	2.29	0.281817	-0.57	1.89	2.10	0.281811	1.37	3	L	3
P9692-10																	4	DO	2
P9692-12	0.281995	0.000036	0.002081	0.070278	1.76	1.80	0.281926	9.26	1.82	1.90	0.281928	8.00	1.71	1.72	0.281924	10.29	3	D	3
P9692-22	0.281635	0.000042	0.000232	0.006627	2.15	2.44	0.281627	-0.74	2.22	2.56	0.281627	-2.10	2.09	2.34	0.281627	0.36	5	ON	2
P9692-24	0.281869	0.000026	0.002276	0.079241	1.94	2.12	0.281795	3.62	2.01	2.22	0.281798	2.40	1.89	2.03	0.281793	4.62	3	DO	2
P9692-25	0.282014	0.000030	0.002241	0.077683	1.74	1.78	0.281940	9.38	1.80	1.88	0.281943	8.13	1.69	1.70	0.281938	10.39	2	L	2
P9692-26	0.282020	0.000040	0.005451	0.215749	1.90	2.02	0.281844	5.10	1.97	2.11	0.281850	4.01	1.85	1.94	0.281839	5.99	4	M	2
P9692-28																	5	OD	2
P9692-33																	4	O	3
P9692-35																	3	DO	2
P9692-36	0.281866	0.000026	0.003152	0.126596	2.00	2.25	0.281772	-0.26	2.07	2.36	0.281775	-1.35	1.94	2.17	0.281769	0.63	4	LD	3
P9692-37																	3	D	2
P9692-38																	4	D	1

<sup>176</sup>Lu decay constant

Sample#	Lu-Hf isotopes				Blichert-Toft & Albarede 1997 (1.93x10 <sup>-11</sup> )				Scherer et al., 2001 (1.865x10 <sup>-11</sup> )				Bizzarro et al., 2003 (1.983x10 <sup>-11</sup> )				Morph.*	Zoning**	Length/width
	<sup>176</sup> Hf/ <sup>177</sup> Hf	± 2 SE	<sup>176</sup> Lu/ <sup>177</sup> Hf	<sup>176</sup> Yb/ <sup>177</sup> Hf	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>			
P9692-39	0.282183	0.000052	0.006113	0.219057	1.68	1.69	0.281983	10.55	1.74	1.78	0.281990	9.47	1.64	1.63	0.281977	11.43	2	D	2
P9692-40																	3	DO	2
P9692-43																	2	D	2
P9692-45	0.282316	0.000052	0.006958	0.243304	1.52	1.48	0.282097	13.12	1.57	1.56	0.282105	12.12	1.48	1.43	0.282091	13.94	2	D	3
P9692-47	0.282075	0.000044	0.003766	0.120105	1.73	1.69	0.281941	12.39	1.79	1.78	0.281946	11.11	1.68	1.62	0.281937	13.43	4	L	3
P9692-48																	5	O	2
P9692-50	0.282183	0.000040	0.004247	0.170433	1.59	1.56	0.282044	12.61	1.65	1.65	0.282049	11.47	1.55	1.50	0.282041	13.55	3	D	2
P9692-51	0.282109	0.000046	0.006316	0.255740	1.81	1.82	0.281887	9.96	1.87	1.91	0.281895	8.81	1.76	1.75	0.281881	10.89	3	DO	1
P9692-52	0.282503	0.000080	0.008267	0.249504	1.27	1.10	0.282213	21.48	1.31	1.16	0.282223	20.42	1.23	1.05	0.282205	22.35	3	D	3
P9692-53	0.281976	0.000044	0.002871	0.098209	1.83	1.93	0.281883	6.64	1.89	2.02	0.281886	5.45	1.78	1.85	0.281880	7.62	2	DO	3
P9692-54	0.281554	0.000060	0.000908	0.026556	2.29	2.57	0.281521	-1.13	2.37	2.70	0.281522	-2.58	2.23	2.47	0.281520	0.04	3	O	3
<b>P9693</b>																			
P9693-2	0.281605	0.000032	0.001339	0.049716	2.25	2.49	0.281555	0.43	2.33	2.61	0.281557	-1.00	2.19	2.39	0.281554	1.60	3	ON	2
P9693-3	0.281754	0.000062	0.001019	0.027220	2.03	2.30	0.281722	0.28	2.10	2.41	0.281723	-0.96	1.98	2.21	0.281721	1.30	3	OD	4
P9693-4	0.281893	0.000040	0.001301	0.041634	1.86	2.10	0.281855	1.74	1.93	2.20	0.281856	-3.62	1.81	2.02	0.281854	2.66	2	DO	2
P9693-8	0.281681	0.000070	0.000812	0.024423	2.12	2.44	0.281655	-1.94	2.19	2.56	0.281656	-0.20	2.06	2.35	0.281654	-0.91	4	OD	4
P9693-9	0.281690	0.000066	0.003145	0.128684	2.24	2.64	0.281596	-6.65	2.32	2.76	0.281600	-7.73	2.18	2.55	0.281594	-5.76	4	OD	3
P9693-10	0.281718	0.000030	0.000962	0.031017	2.08	2.34	0.281686	0.28	2.15	2.46	0.281687	-1.01	2.02	2.25	0.281685	1.33	4	DO	2
<b>P9693-10R</b>																			
P9693-11	0.281682	0.000040	0.003144	0.106521	2.25	2.58	0.281579	-3.60	2.33	2.70	0.281582	-4.80	2.19	2.48	0.281576	-2.62	4	DO	4
P9693-12																	3	OD	2
P9693-13	0.281777	0.000020	0.001646	0.054030	2.04	2.45	0.281733	-5.59	2.11	2.56	0.281735	-6.61	1.98	2.36	0.281732	-4.77	4	OM	2
P9693-14																	3	DO	3
P9693-15	0.281685	0.000046	0.001024	0.032574	2.13	2.45	0.281652	-2.08	2.20	2.57	0.281653	-3.33	2.07	2.35	0.281651	-1.06	3	O	3
P9693-16	0.281752	0.000026	0.001799	0.060763	2.08	2.30	0.281691	1.48	2.15	2.41	0.281693	0.19	2.02	2.21	0.281689	2.54	2	DO	2
P9693-17	0.281683	0.000026	0.001245	0.043042	2.14	2.46	0.281643	-2.18	2.22	2.58	0.281644	-3.43	2.08	2.37	0.281642	-1.16	3	DO	4
P9693-18	0.281730	0.000030	0.002722	0.112731	2.16	2.53	0.281649	-4.93	2.24	2.65	0.281652	-6.02	2.10	2.44	0.281647	-4.04	1	DM	3
P9693-19	0.281747	0.000036	0.001166	0.033060	2.05	2.30	0.281709	0.89	2.12	2.41	0.281710	-0.39	2.00	2.21	0.281708	1.93	3	OD	2
P9693-20	0.281565	0.000082	0.000779	0.023525	2.27	2.65	0.281539	-4.58	2.35	2.78	0.281540	-5.88	2.21	2.55	0.281538	-3.51	3	OD	3
P9693-21	0.281798	0.000090	0.001303	0.038961	1.99	2.32	0.281761	-1.99	2.06	2.43	0.281762	-3.10	1.94	2.23	0.281759	-1.08	3	OD	3
P9693-23	0.281716	0.000054	0.002331	0.091999	2.16	2.41	0.281636	-0.08	2.23	2.53	0.281639	-1.36	2.10	2.32	0.281634	0.96	4	D	3
P9693-24	0.281647	0.000130	0.001095	0.033047	2.18	2.62	0.281615	-6.53	2.26	2.74	0.281616	-7.67	2.12	2.52	0.281614	-5.60	3	DN	3
P9693-25	0.281729	0.000042	0.001144	0.038713	2.07	2.36	0.281693	-0.88	2.15	2.48	0.281694	-2.12	2.02	2.27	0.281692	0.12	3	D	3
P9693-26	0.281759	0.000038	0.001511	0.049764	2.05	2.41	0.281715	-3.45	2.12	2.53	0.281717	-4.56	2.00	2.32	0.281714	-2.55	3	M	2
P9693-27	0.282147	0.000100	0.004857	0.180099	1.68	1.71	0.281994	9.59	1.73	1.80	0.281999	8.50	1.63	1.64	0.281989	10.47	4	D	3
P9693-28	0.281488	0.000144	0.001635	0.053159	2.43	2.94	0.281437	-10.75	2.51	3.08	0.281439	-11.94	2.36	2.84	0.281436	-9.78	3	D	3
P9693-29	0.281709	0.000024	0.000862	0.028956	2.08	2.34	0.281680	0.46	2.16	2.46	0.281681	-0.84	2.03	2.25	0.281680	1.53	3	ON	3
P9693-30	0.281719	0.000038	0.000881	0.026475	2.07	2.36	0.281691	-0.58	2.14	2.48	0.281692	-1.83	2.02	2.27	0.281690	0.45	4	OD	2
P9693-31	0.281729	0.000028	0.001057	0.039180	2.07	2.35	0.281695	-0.31	2.14	2.46	0.281696	-1.56	2.01	2.26	0.281694	0.72	3	D	3
P9693-32	0.281773	0.000024	0.002266	0.088764	2.08	2.47	0.281711	-5.56	2.15	2.59	0.281713	-6.58	2.02	2.39	0.281710	-4.73	3	OM	3
P9693-33	0.281761	0.000026	0.002512	0.094246	2.11	2.45	0.281687	-3.76	2.18	2.57	0.281689	-4.86	2.05	2.37	0.281685	-2.87	3	ODN	2
P9693-35	0.281700	0.000042	0.001511	0.053217	2.13	2.36	0.281647	1.26	2.21	2.48	0.281649	-0.08	2.08	2.26	0.281646	2.36	3	D	2
P9693-36	0.281669	0.000070	0.001563	0.048017	2.18	2.54	0.281620	-3.98	2.25	2.66	0.281622	-5.18	2.12	2.44	0.281619	-3.00	4	D	3
P9693-38	0.281747	0.000022	0.000836	0.027760	2.03	2.27	0.281719	1.48	2.10	2.38	0.281720	0.18	1.98	2.18	0.281719	2.53	4	D	3
<b>P9693-40R</b>																			
P9693-41	0.281769	0.000032	0.001592	0.058145	2.04	2.28	0.281717	1.08	2.12	2.39	0.281719	-0.17	1.99	2.19	0.281715	2.11	3	D	3
P9693-42	0.281757	0.000050	0.002078	0.074535	2.09	2.44	0.281696	-3.73	2.16	2.56	0.281698	-4.83	2.03	2.35	0.281695	-2.83	2	M	2
P9693-43	0.281864	0.000024	0.001045	0.032015	1.89	2.43	0.281843	-9.55	1.95	2.53	0.281844	-10.32	1.84	2.35	0.281843	-8.92	4	LM	2
P9693-47	0.281735	0.000032	0.001234	0.048192	2.07	2.27	0.281692	2.51	2.14	2.39	0.281694	1.16	2.01	2.18	0.281691	3.61	4	D	2
P9693-48	0.281647	0.000066	0.001895	0.062292	2.23	2.46	0.281578	0.33	2.30	2.59	0.281581	-1.05	2.17	2.37	0.281576	1.45	4	D	3
P9693-51	0.281704	0.000038	0.001850	0.065874	2.15	2.47	0.281645	-2.59	2.22	2.59	0.281647	-3.80	2.09	2.38	0.281644	-1.60	4	OD	3

<sup>176</sup>Lu decav constant

Sample#	Lu-Hf isotopes				Blichert-Toft & Albarede 1997 (1.93x10 <sup>-11</sup> )				Scherer et al., 2001 (1.865x10 <sup>-11</sup> )				Bizzarro et al., 2003 (1.983x10 <sup>-11</sup> )				Morph.*	Zoning**	Length/width
	<sup>176</sup> Hf/ <sup>177</sup> Hf	± 2 SE	<sup>176</sup> Lu/ <sup>177</sup> Hf	<sup>176</sup> Yb/ <sup>177</sup> Hf	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>			
P9693-52	0.281678	0.000058	0.001371	0.051813	2.15	2.43	0.281632	-0.63	2.23	2.55	0.281633	-1.94	2.10	2.34	0.281630	0.44	4	D	2
P9693-54	0.281784	0.000122	0.001775	0.047095	2.03	2.24	0.281725	2.22	2.10	2.35	0.281727	0.95	1.98	2.15	0.281723	3.27	3	OD	3
P9693-55	0.281865	0.000064	0.007162	0.301548	2.25	2.43	0.281616	0.00	2.33	2.54	0.281624	-1.11	2.19	2.35	0.281609	0.90	4	D	3
P9693-56	0.281719	0.000030	0.001423	0.045458	2.10	2.35	0.281671	0.43	2.18	2.47	0.281673	-0.87	2.05	2.26	0.281670	1.48	4	D	2
P9693-57	0.281902	0.000032	0.001430	0.051236	1.86	2.11	0.281861	1.10	1.92	2.21	0.281863	0.01	1.81	2.03	0.281860	1.99	3	O	3
P9693-58	0.281772	0.000030	0.001015	0.030858	2.01	2.46	0.281746	-6.42	2.08	2.57	0.281747	-7.41	1.96	2.37	0.281745	-5.61	2	OD	3
P9693-59	0.281733	0.000040	0.001759	0.054526	2.10	2.33	0.281673	1.17	2.18	2.45	0.281675	-0.13	2.05	2.24	0.281671	2.23	3	D	3
P9693-60	0.281829	0.000024	0.001898	0.059206	1.98	2.62	0.281797	-14.48	2.05	2.72	0.281798	-15.12	1.93	2.53	0.281796	-13.96	3	ODM	2
P9693-61	0.281668	0.000070	0.001253	0.041052	2.16	2.46	0.281626	-1.55	2.24	2.58	0.281628	-2.83	2.10	2.37	0.281625	-0.49	4	D	4
<b>P9694</b>																			
P9694-6	0.281899	0.000022	0.023245	0.069741	4.42	3.40	0.281304	-21.92	4.58	3.50	0.281324	-22.23	4.31	3.32	0.281287	-21.67	2	OM	3
P9694-13	0.281960	0.000084	0.006623	0.290035	2.06	2.32	0.281776	-2.57	2.13	2.41	0.281782	-3.47	2.01	2.24	0.281771	-1.84	3	OM	3
P9694-14																	4	N	2
P9694-15	0.281875	0.000060	0.008770	0.349880	2.35	2.61	0.281621	-6.71	2.43	2.72	0.281630	-7.57	2.29	2.53	0.281614	-6.01	3	M	3
P9694-17	0.281293	0.000042	0.001867	0.066036	2.70	2.85	0.281202	1.90	2.80	3.01	0.281205	0.02	2.63	2.73	0.281199	3.43	3	D	2
P9694-18																	5	D	2
P9694-19	0.281057	0.000074	0.001136	0.039556	2.96	3.29	0.281001	-5.18	3.07	3.46	0.281003	-7.10	2.88	3.16	0.281000	-3.61	5	DO	3
P9694-22																	4	LD	3
P9694-23	0.281198	0.000072	0.000605	0.018839	2.74	2.91	0.281168	1.40	2.83	3.07	0.281169	-0.58	2.67	2.78	0.281167	3.01	5	DO	3
P9694-24	0.281242	0.000062	0.002946	0.108249	2.85	3.04	0.281094	-0.24	2.95	3.20	0.281099	-2.11	2.78	2.92	0.281090	1.28	3	DO	3
P9694-26																	5	ON	2
P9694-27	0.281763	0.000062	0.001087	0.036004	2.02	2.09	0.281722	7.54	2.10	2.20	0.281723	6.05	1.97	2.00	0.281721	8.76	5	ODN	2
P9694-30	0.282310	0.000186	0.001743	0.111250													4	OD	2
P9694-36	0.281471	0.000068	0.000288	0.008803													4	ON	2
P9694-37	0.282006	0.000030	0.000434	0.122608	1.84	1.94	0.281874	6.62	1.91	2.03	0.281879	5.46	1.79	1.86	0.281871	7.56	3	DM	2
P9694-38	0.281624	0.000076	0.000635	0.022575	2.18	2.42	0.281601	0.76	2.26	2.55	0.281602	-0.66	2.13	2.33	0.281601	1.92	5	DO	3
P9694-39	0.281662	0.000066	0.001248	0.043718	2.17	2.47	0.281621	-1.77	2.24	2.60	0.281622	-3.06	2.11	2.38	0.281619	-0.72	4	OD	2
P9694-40	0.281978	0.000056	0.002539	0.081501	1.81	1.92	0.281898	6.08	1.87	2.02	0.281901	4.91	1.76	1.85	0.281896	7.04	3	D	2
P9694-41	0.281766	0.000300	0.000822	0.030629													5	D	2
P9694-43	0.281546	0.000060	0.000420	0.012910	2.27	2.51	0.281530	0.50	2.35	2.65	0.281531	-1.01	2.21	2.41	0.281530	1.73	4	N	2
P9694-53																	3	DM	3
P9694-57	0.281514	0.000082	0.001383	0.047511	2.37	2.70	0.281463	-3.40	2.46	2.84	0.281465	-4.81	2.31	2.60	0.281462	-2.25	5	D	2
P9694-62	0.281533	0.000062	0.000938	0.031402	2.32	2.54	0.281496	1.02	2.40	2.67	0.281497	-0.53	2.26	2.44	0.281495	2.28	4	OD	3
<b>P9695</b>																			
P9695-3	0.281479	0.000040	0.000848	0.025494	2.39	2.73	0.281448	-3.76	2.47	2.87	0.281449	-5.21	2.32	2.63	0.281447	-2.59	4	ON	2
P9695-7	0.281514	0.000080	0.000416	0.012210	2.32	1.94	0.281491	20.95	2.40	2.08	0.281491	18.67	2.25	1.83	0.281490	22.81	5	OD	3
P9695-9	0.281538	0.000058	0.001010	0.032216	2.32	2.60	0.281500	-1.15	2.40	2.73	0.281502	-2.61	2.26	2.49	0.281499	0.05	5	N	2
P9695-10	0.281727	0.000060	0.001037	0.031674	2.07	2.17	0.281688	6.06	2.14	2.29	0.281689	4.58	2.01	2.08	0.281687	7.27	4	ON	2
P9695-11	0.281632	0.000074	0.000474	0.014288	2.16	2.34	0.281614	3.18	2.24	2.46	0.281615	1.68	2.11	2.24	0.281614	4.40	4	ON	2
P9695-12	0.281588	0.000060	0.000422	0.016158	2.22	2.42	0.281572	1.94	2.30	2.55	0.281573	0.44	2.16	2.32	0.281572	3.18	5	N	2
P9695-14	0.281657	0.000056	0.000999	0.032457	2.16	2.36	0.281620	2.27	2.24	2.48	0.281622	0.83	2.10	2.26	0.281619	3.44	4	DN	2
P9695-16	0.281518	0.000058	0.001030	0.032064	2.35	2.68	0.281481	-3.12	2.43	2.81	0.281482	-4.54	2.28	2.57	0.281480	-1.96	5	N	2
P9695-17	0.281111	0.000084	0.000563	0.018427	2.85	3.09	0.281083	-1.53	2.95	3.26	0.281084	-3.51	2.77	2.96	0.281082	0.09	4	O	2
P9695-20	0.281811	0.000044	0.003901	0.135389	2.12	2.40	0.281690	-1.89	2.19	2.51	0.281694	-2.99	2.06	2.31	0.281687	-0.99	1	M	-
P9695-22	0.281682	0.000066	0.000422	0.013351	2.10	2.23	0.281666	4.72	2.17	2.36	0.281667	3.23	2.04	2.14	0.281666	5.94	5	N	2
P9695-24	0.281561	0.000036	0.000513	0.013756	2.26	2.53	0.281542	-0.42	2.34	2.66	0.281543	-1.88	2.20	2.43	0.281542	0.78	5	LN	2
P9695-26	0.281549	0.000040	0.001489	0.046077	2.33	2.65	0.281495	-2.86	2.42	2.78	0.281497	-4.25	2.27	2.55	0.281494	-1.72	3	OD	2
P9695-27	0.281131	0.000056	0.001003	0.034210	2.86	3.03	0.281079	0.59	2.96	3.20	0.281081	-1.45	2.78	2.90	0.281078	2.25	2	OD	3
P9695-31	0.281586	0.000026	0.000415	0.016074	2.22	2.42	0.281570	2.14	2.30	2.55	0.281571	0.62	2.16	2.32	0.281570	3.38	5	DN	2
P9695-37	0.281530	0.000036	0.000812	0.024112	2.32	2.62	0.281500	-1.84	2.40	2.75	0.281501	-3.29	2.26	2.51	0.281499	-0.65	5	N	2

<sup>176</sup>Lu decav constant

Sample#	Lu-Hf isotopes				Blichert-Toft & Albarede 1997 (1.93x10 <sup>-11</sup> )				Scherer et al., 2001 (1.865x10 <sup>-11</sup> )				Bizzarro et al., 2003 (1.983x10 <sup>-11</sup> )				Morph.*	Zoning**	Length/width
	<sup>176</sup> Hf/ <sup>177</sup> Hf	± 2 SE	<sup>176</sup> Lu/ <sup>177</sup> Hf	<sup>176</sup> Yb/ <sup>177</sup> Hf	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>	T <sub>DM</sub> (Ga)	T <sub>DM</sub> <sup>C</sup> (Ga)	Hf <sub>i</sub>	ε <sub>Hf</sub>			
P9695-40	0.281244	0.000110	0.001839	0.062501	2.77	3.04	0.281159	-2.95	2.86	3.20	0.281162	-4.72	2.69	2.92	0.281157	-1.51	4	DM	2
P9695-42	0.281522	0.000064	0.000398	0.011626	2.30	2.59	0.281507	-1.05	2.38	2.72	0.281508	-2.53	2.24	2.48	0.281507	0.17	5	N	2
P9695-50																	2	L	2
P9695-51	0.281627	0.000054	0.001635	0.061739	2.24	2.49	0.281568	-0.27	2.32	2.62	0.281570	-1.66	2.18	2.40	0.281566	0.86	3	O	2
P9695-52	0.281593	0.000046	0.000088	0.003386	2.19	2.39	0.281590	2.36	2.27	2.52	0.281590	0.84	2.14	2.29	0.281590	3.60	5	ON	2
P9695-53	0.281735	0.000084	0.002894	0.118726	2.16	2.39	0.281635	0.42	2.24	2.51	0.281638	-0.85	2.11	2.30	0.281632	1.46	3	OD	3
P9695-54	0.281605	0.000118	0.004780	0.209902	2.48	2.83	0.281442	-6.95	2.56	2.96	0.281447	-8.13	2.41	2.73	0.281437	-5.99	4	O	3
P9695-57																	4	OD	2
P9695-59	0.281707	0.000046	0.000375	0.011588	2.06	2.19	0.281693	5.09	2.13	2.31	0.281694	3.62	2.01	2.10	0.281693	6.29	5	N	2
P9695-65	0.281542	0.000048	0.000456	0.014505	2.28	2.54	0.281525	-0.34	2.36	2.68	0.281526	-1.83	2.22	2.44	0.281525	0.87	5	ON	2

# C, core; R, rim

\* 1 - euhedral to 5 -rounded

\*\*O-oscillatory; D-diffusive; L-laminated; N-no zoning; M-metamict. In order from less important to predominant.

*Rejected data are in Italic*

## Appendix 2. Zir

Sample#	Modelled Rock Type
<b>P9686</b>	
P9686-1	Granitoid 70-75% SiO2
P9686-2	Granitoid 70-75% SiO2
P9686-3	Granitoid 70-75% SiO2
P9686-4	Granitoid 70-75% SiO2
P9686-5	Granitoid 70-75% SiO2
P9686-7	Dolerite
P9686-8	Granitoid 70-75% SiO2
P9686-9	Granitoid 70-75% SiO2
P9686-11	Granitoid 70-75% SiO2
P9686-13	Granitoid 70-75% SiO2
P9686-14	Granitoid 70-75% SiO2
P9686-15	Granitoid <65% SiO2
P9686-16	Dolerite
P9686-17	Granitoid 70-75% SiO2
P9686-20	Granitoid <65% SiO2
P9686-21	Granitoid 70-75% SiO2
P9686-24	insufficient parameters
P9686-26	insufficient parameters
P9686-27	insufficient parameters
P9686-28	insufficient parameters
P9686-29	insufficient parameters
P9686-33	insufficient parameters
P9686-35	Granitoid 70-75% SiO2
P9686-36	Granitoid 70-75% SiO2
P9686-37	Granitoid 70-75% SiO2
P9686-38	Granitoid 70-75% SiO2
P9686-42	Ne-syenite & Syenite pegmatites
P9686-43	Granitoid 70-75% SiO2
P9686-46	Granitoid 70-75% SiO2
P9686-48	Granitoid 70-75% SiO2
P9686-50	Granitoid 70-75% SiO2
<b>P9687</b>	
P9687-3	Granitoid >75% SiO2
P9687-8	Granitoid <65% SiO2
P9687-11	Granitoid 70-75% SiO2
P9687-16	Granitoid 70-75% SiO2
P9687-17	Granitoid 70-75% SiO2
P9687-18	Granitoid 70-75% SiO2
P9687-19	Granitoid <65% SiO2
P9687-25	Granitoid 70-75% SiO2
P9687-26	Dolerite
P9687-27	Granitoid <65% SiO2
P9687-28	Dolerite
P9687-29	Granitoid >75% SiO2
P9687-30	Granitoid 70-75% SiO2
P9687-33	Granitoid <65% SiO2
P9687-34	Granitoid <65% SiO2
P9687-35	Granitoid 70-75% SiO2

Sample#	Modelled Rock Type
P9687-36	Dolerite
P9687-37	Granitoid 70-75% SiO2
P9687-40	Dolerite
P9687-42	insufficient parameters
P9687-43	Granitoid <65% SiO2
P9687-44	insufficient parameters
P9687-45	insufficient parameters
P9687-46	insufficient parameters
P9687-47	insufficient parameters
P9687-48	insufficient parameters
P9687-49	Granitoid 70-75% SiO2
P9687-50	insufficient parameters
P9687-51	Granitoid 70-75% SiO2
P9687-52	insufficient parameters
P9687-53	insufficient parameters
P9687-54	Granitoid 70-75% SiO2
P9687-55	Granitoid 70-75% SiO2
P9687-56	insufficient parameters
P9687-59	Dolerite
P9687-60	Granitoid 70-75% SiO2
P9687-63	insufficient parameters
<b>P9688</b>	
P9688-2	Granitoid 70-75% SiO2
P9688-4	Granitoid <65% SiO2
P9688-5	Granitoid <65% SiO2
P9688-6	Granitoid <65% SiO2
P9688-7	Granitoid 70-75% SiO2
P9688-8	insufficient parameters
P9688-10	Granitoid 70-75% SiO2
P9688-11	insufficient parameters
P9688-12	insufficient parameters
P9688-13	Granitoid 70-75% SiO2
P9688-14	Granitoid 70-75% SiO2
P9688-16	Granitoid 70-75% SiO2
P9688-17	Granitoid 70-75% SiO2
P9688-18	Granitoid 70-75% SiO2
P9688-19	Dolerite
P9688-20	Granitoid 70-75% SiO2
P9688-21	Granitoid 70-75% SiO2
P9688-23	Granitoid 70-75% SiO2
P9688-25	Granitoid >75% SiO2
P9688-26	insufficient parameters
P9688-27	insufficient parameters
P9688-28	Granitoid 70-75% SiO2
P9688-31	Granitoid 70-75% SiO2
P9688-32	Granitoid 70-75% SiO2
P9688-35	Granitoid 70-75% SiO2
P9688-36	Granitoid >75% SiO2
P9688-37	Granitoid 70-75% SiO2
P9688-39	Granitoid 70-75% SiO2
P9688-40	Granitoid 70-75% SiO2

Sample#	Modelled Rock Type
P9688-41	insufficient parameters
P9688-42	Granitoid 70-75% SiO2
P9688-43	Granitoid 70-75% SiO2
P9688-44	Granitoid 70-75% SiO2
P9688-45	Granitoid >75% SiO2
P9688-46	Dolerite
P9688-47	Granitoid 70-75% SiO2
P9688-49	Granitoid 70-75% SiO2
P9688-50	Dolerite
P9688-51	Dolerite
P9688-51-rim	
P9688-53	Granitoid 70-75% SiO2
P9688-54	Granitoid 70-75% SiO2
<b>P9689</b>	
P9689-13	Granitoid >75% SiO2
P9689-14	Granitoid <65% SiO2
P9689-20	insufficient parameters
P9689-29	Granitoid <65% SiO2
P9689-30	insufficient parameters
P9689-33	Dolerite
P9689-35	insufficient parameters
P9689-36	Dolerite
P9689-37	Dolerite
P9689-39	Dolerite
P9689-42	Carbonatite
P9689-43	Larvikite
P9689-44	Dolerite
P9689-44R	
P9689-46	Larvikite
P9689-48	Granitoid <65% SiO2
P9689-50	Granitoid 70-75% SiO2
P9689-51	Granitoid 70-75% SiO2
P9689-53	Granitoid 70-75% SiO2
P9689-57	Granitoid <65% SiO2
P9689-58	Granitoid 70-75% SiO2
P9689-59	Granitoid 70-75% SiO2
P9689-60	Dolerite
P9689-63	Basalt
P9689-64	Dolerite
<b>P9690</b>	
P9690-1	Granitoid >75% SiO2
P9690-2	Dolerite
P9690-3	Granitoid 70-75% SiO2
P9690-5	Dolerite
P9690-6	Larvikite
P9690-7	Granitoid <65% SiO2
P9690-9	Granitoid 70-75% SiO2
P9690-10	Granitoid 70-75% SiO2
P9690-12	Granitoid 70-75% SiO2
P9690-13	Granitoid 70-75% SiO2

Sample#	Modelled Rock Type
P9690-14	Dolerite
P9690-15	Granitoid 70-75% SiO2
P9690-17	Granitoid 70-75% SiO2
P9690-18	Granitoid 70-75% SiO2
P9690-19	Granitoid 70-75% SiO2
P9690-20	Dolerite
P9690-21	Granitoid 70-75% SiO2
P9690-23	Granitoid 70-75% SiO2
P9690-25	Granitoid <65% SiO2
P9690-27	Granitoid 70-75% SiO2
P9690-28	Ne-syenite & Syenite pegmatites
P9690-29	Granitoid 70-75% SiO2
P9690-30	Granitoid <65% SiO2
P9690-31	Carbonatite
P9690-32	Dolerite
P9690-33	Granitoid <65% SiO2
P9690-34	Granitoid 70-75% SiO2
P9690-35	insufficient parameters
P9690-36	Granitoid <65% SiO2
P9690-37	insufficient parameters
P9690-38	Granitoid 70-75% SiO2
P9690-41	Dolerite
P9690-42	insufficient parameters
P9690-44	insufficient parameters
P9690-45	Dolerite
P9690-46	Granitoid <65% SiO2
P9690-47	Granitoid 70-75% SiO2
P9690-48	Dolerite
P9690-49	Granitoid 70-75% SiO2
P9690-50	Granitoid 70-75% SiO2
<b>P9691</b>	
P9691-1	Dolerite
P9691-2	Granitoid 70-75% SiO2
P9691-4	Granitoid 70-75% SiO2
P9691-5	Granitoid 70-75% SiO2
P9691-6	Dolerite
P9691-8	Granitoid 70-75% SiO2
P9691-9	Dolerite
P9691-10	Granitoid <65% SiO2
P9691-11	Granitoid 70-75% SiO2
P9691-13	Granitoid <65% SiO2
P9691-14	Dolerite
P9691-15	Granitoid 70-75% SiO2
P9691-17	Granitoid 70-75% SiO2
P9691-18	Dolerite
P9691-19	Dolerite
P9691-19R	
P9691-20	Granitoid >75% SiO2
P9691-21	Granitoid 70-75% SiO2
P9691-22	Dolerite
P9691-22R	

Sample#	Modelled Rock Type
P9691-23	Granitoid 70-75% SiO2
P9691-24	Granitoid 70-75% SiO2
P9691-25	Granitoid 70-75% SiO2
P9691-26	Dolerite
P9691-27	Granitoid 70-75% SiO2
P9691-28	Dolerite
P9691-30	Granitoid >75% SiO2
P9691-31	Dolerite
P9691-32	Granitoid 70-75% SiO2
P9691-33	Granitoid >75% SiO2
P9691-34	Dolerite
P9691-35	Larvikite
P9691-36	Granitoid 70-75% SiO2
P9691-37	Larvikite
P9691-38	Larvikite
P9691-39	Granitoid <65% SiO2
P9691-40	Granitoid >75% SiO2
P9691-41	Granitoid 70-75% SiO2
P9691-42	Granitoid 70-75% SiO2
P9691-43	insufficient parameters
P9691-43R	
P9691-44	Granitoid 70-75% SiO2
P9691-45	Granitoid <65% SiO2
P9691-46	Dolerite
P9691-47	Larvikite
P9691-48	Larvikite
P9691-49	Dolerite
P9691-50	insufficient parameters
P9691-51	Granitoid >75% SiO2
P9691-52	Granitoid >75% SiO2
P9691-53	Ne-syenite & Syenite pegmatites
P9691-54	Larvikite
P9691-55	Granitoid >75% SiO2
P9691-56	Dolerite
P9691-57	Larvikite
<b>P9692</b>	
P9692-2	Larvikite
P9692-3	Granitoid 70-75% SiO2
P9692-8	Dolerite
P9692-10	insufficient parameters
P9692-12	Larvikite
P9692-22	Carbonatite
P9692-24	Granitoid 70-75% SiO2
P9692-25	Granitoid 70-75% SiO2
P9692-26	Larvikite
P9692-28	insufficient parameters
P9692-33	insufficient parameters
P9692-35	insufficient parameters
P9692-36	Granitoid 70-75% SiO2
P9692-37	insufficient parameters
P9692-38	insufficient parameters

Sample#	Modelled Rock Type
P9692-39	Larvikite
P9692-40	insufficient parameters
P9692-43	insufficient parameters
P9692-45	Larvikite
P9692-47	Larvikite
P9692-48	insufficient parameters
P9692-50	Larvikite
P9692-51	Larvikite
P9692-52	Ne-syenite & Syenite pegmatites
P9692-53	Granitoid 70-75% SiO2
P9692-54	Granitoid 70-75% SiO2
<b>P9693</b>	
P9693-2	Granitoid 70-75% SiO2
P9693-3	Larvikite
P9693-4	Granitoid 70-75% SiO2
P9693-8	Granitoid <65% SiO2
P9693-9	Granitoid 70-75% SiO2
P9693-10	Granitoid 70-75% SiO2
P9693-10R	
P9693-11	Granitoid 70-75% SiO2
P9693-12	insufficient parameters
P9693-13	Granitoid 70-75% SiO2
P9693-14	insufficient parameters
P9693-15	Granitoid 70-75% SiO2
P9693-16	Granitoid 70-75% SiO2
P9693-17	Granitoid 70-75% SiO2
P9693-18	Granitoid 70-75% SiO2
P9693-19	Granitoid 70-75% SiO2
P9693-20	Larvikite
P9693-21	Granitoid 70-75% SiO2
P9693-23	Dolerite
P9693-24	Granitoid 70-75% SiO2
P9693-25	Dolerite
P9693-26	Dolerite
P9693-27	Granitoid 70-75% SiO2
P9693-28	Granitoid 70-75% SiO2
P9693-29	Granitoid <65% SiO2
P9693-30	Granitoid 70-75% SiO2
P9693-31	Granitoid 70-75% SiO2
P9693-32	Granitoid 70-75% SiO2
P9693-33	Granitoid >75% SiO2
P9693-35	Granitoid 70-75% SiO2
P9693-36	Granitoid 70-75% SiO2
P9693-38	Granitoid 70-75% SiO2
P9693-40R	
P9693-41	Granitoid 70-75% SiO2
P9693-42	Granitoid 70-75% SiO2
P9693-43	Granitoid 70-75% SiO2
P9693-47	Granitoid 70-75% SiO2
P9693-48	Granitoid 70-75% SiO2
P9693-51	Dolerite

Sample#	Modelled Rock Type
P9693-52	Dolerite
P9693-54	Granitoid 70-75% SiO2
P9693-55	Larvikite
P9693-56	Granitoid 70-75% SiO2
P9693-57	Granitoid 70-75% SiO2
P9693-58	Granitoid 70-75% SiO2
P9693-59	Granitoid 70-75% SiO2
P9693-60	Granitoid 70-75% SiO2
P9693-61	Granitoid >75% SiO2
<b>P9694</b>	
P9694-6	Ne-syenite & Syenite pegmatites
P9694-13	Ne-syenite & Syenite pegmatites
P9694-14	insufficient parameters
P9694-15	Ne-syenite & Syenite pegmatites
P9694-17	Granitoid 70-75% SiO2
P9694-18	insufficient parameters
P9694-19	Larvikite
P9694-22	insufficient parameters
P9694-23	Granitoid <65% SiO2
P9694-24	Granitoid 70-75% SiO2
P9694-26	insufficient parameters
P9694-27	Granitoid 70-75% SiO2
P9694-30	Granitoid 70-75% SiO2
P9694-36	Granitoid <65% SiO2
P9694-37	Granitoid 70-75% SiO2
P9694-38	Dolerite
P9694-39	Granitoid 70-75% SiO2
P9694-40	Granitoid 70-75% SiO2
P9694-41	Dolerite
P9694-43	Granitoid <65% SiO2
P9694-53	insufficient parameters
P9694-57	Granitoid 70-75% SiO2
P9694-62	Granitoid 70-75% SiO2
<b>P9695</b>	
P9695-3	Granitoid <65% SiO2
P9695-7	Granitoid <65% SiO2
P9695-9	Granitoid 70-75% SiO2
P9695-10	Granitoid 70-75% SiO2
P9695-11	Granitoid <65% SiO2
P9695-12	Granitoid <65% SiO2
P9695-14	Granitoid 70-75% SiO2
P9695-16	Granitoid 70-75% SiO2
P9695-17	Granitoid <65% SiO2
P9695-20	Granitoid 70-75% SiO2
P9695-22	Granitoid 70-75% SiO2
P9695-24	Granitoid <65% SiO2
P9695-26	Granitoid 70-75% SiO2
P9695-27	Dolerite
P9695-31	Granitoid <65% SiO2
P9695-37	Granitoid <65% SiO2

<b>Sample#</b>	<b>Modelled Rock Type</b>
P9695-40	Granitoid 70-75% SiO2
P9695-42	Granitoid <65% SiO2
P9695-50	insufficient parameters
P9695-51	Granitoid 70-75% SiO2
P9695-52	Carbonatite
P9695-53	Granitoid 70-75% SiO2
P9695-54	Granitoid 70-75% SiO2
P9695-57	insufficient parameters
P9695-59	Granitoid <65% SiO2
P9695-65	Granitoid <65% SiO2