Electronic Supplementary Material (ESI) for Journal of Analytical Atomic Spectrometry.

ESI Data Table 2: Analytical results for the U-Pb age of monazite crystals

Date	Sample	Conditions	No.	$^{207}Pb/^{235}U$	1SD	$^{206}Pb/^{238}U$	1SD	Error correlation	$^{207}Pb/^{235}U$	2SD	$^{206}Pb/^{238}U$	2SD	$^{207}Pb/^{206}Pb$	2SD
		Dia./Rep./WL.		Ratio		Ratio			Age (Ma)		Age (Ma)		Age (Ma)	
20140716	Thompson	30µmRR/5Hz/200nm	1	4.5693	0.2422	0.3083	0.0163	0.9948	1743.7	440.5	1732.3	208.0	1757.3	18.9
20140716	Thompson	30µmRR/5Hz/200nm	2	4.6172	0.2088	0.3105	0.0139	0.9927	1752.4	385.1	1743.0	178.5	1763.6	19.2
20140716	Thompson	30µmRR/5Hz/200nm	3	4.5555	0.1920	0.3060	0.0127	0.9880	1741.2	356.7	1721.0	163.3	1765.4	23.0
20140716	Thompson	30µmRR/5Hz/200nm	4	4.6083	0.2418	0.3113	0.0162	0.9939	1750.8	439.8	1746.9	207.6	1755.4	20.4
20140716	Thompson	30µmRR/5Hz/200nm	5	4.6361	0.2471	0.3122	0.0165	0.9931	1755.8	448.4	1751.6	211.3	1760.7	22.0
20140716	Thompson	30µmRR/5Hz/200nm	6	4.7277	0.2676	0.3171	0.0178	0.9945	1772.2	481.5	1775.4	228.1	1768.3	21.0
20140716	Thompson	30µmRR/5Hz/200nm	7	4.5827	0.1936	0.3095	0.0130	0.9925	1746.1	359.4	1738.4	166.3	1755.4	18.1
20140716	Thompson	30µmRR/5Hz/200nm	8	4.5505	0.1963	0.3099	0.0133	0.9919	1740.3	364.0	1740.4	169.9	1740.1	19.0
20140716	Thompson	30µmRR/5Hz/200nm	9	4.5862	0.1752	0.3118	0.0118	0.9891	1746.8	327.8	1749.5	151.0	1743.4	19.6
20140716	Thompson	30µmRR/5Hz/200nm	10	4.6206	0.2017	0.3122	0.0135	0.9925	1753.0	373.1	1751.4	173.2	1754.9	18.8
		Reference age: 1766 Ma (ID-TIMS), Williams et al. (1996)						**Weighted mean =**	**1749.0**	**123.1**	**1743.5**	**57.3**	**1755.9**	**6.3**
20140716	Thompson	30µm/2Hz/266nm	1	4.7116	0.2166	0.3168	0.0145	0.9933	1769.3	398.1	1774.0	185.1	1763.7	18.7
20140716	Thompson	30µm/2Hz/266nm	2	4.7114	0.1429	0.3174	0.0096	0.9922	1769.3	271.2	1777.0	122.6	1760.1	13.3
20140716	Thompson	30µm/2Hz/266nm	3	4.6581	0.1616	0.3138	0.0108	0.9914	1759.7	304.3	1759.6	138.5	1759.9	16.0
20140716	Thompson	30µm/2Hz/266nm	4	4.6371	0.1407	0.3123	0.0094	0.9894	1756.0	267.4	1752.2	120.4	1760.5	15.5
20140716	Thompson	30µm/2Hz/266nm	5	4.6270	0.1457	0.3117	0.0097	0.9897	1754.1	276.3	1749.2	124.7	1760.0	15.8
20140716	Thompson	30µm/2Hz/266nm	6	4.6355	0.1824	0.3124	0.0122	0.9943	1755.7	340.2	1752.4	156.6	1759.6	14.8
20140716	Thompson	30µm/2Hz/266nm	7	4.7406	0.2665	0.3184	0.0178	0.9971	1774.4	479.8	1781.9	228.1	1765.6	15.1
20140716	Thompson	30µm/2Hz/266nm	8	4.6755	0.2049	0.3144	0.0137	0.9954	1762.9	378.6	1762.4	175.7	1763.4	14.7
20140716	Thompson	30µm/2Hz/266nm	9	4.6118	0.1475	0.3102	0.0098	0.9915	1751.4	279.4	1741.9	126.2	1762.8	14.7
20140716	Thompson	30µm/2Hz/266nm	10	4.6409	0.1543	0.3138	0.0103	0.9838	1756.7	291.3	1759.3	131.6	1753.5	20.9
		Reference age: 1766 Ma (ID-TIMS), Williams et al. (1996)						**Weighted mean =**	**1759.5**	**98.8**	**1758.6**	**45.0**	**1761.2**	**4.9**
20140716	Manangotry	30µmRR/5Hz/200nm	1	0.7141	0.0314	0.0871	0.0038	0.9844	547.2	62.7	538.5	48.5	583.3	9.0
20140716	Manangotry	30µmRR/5Hz/200nm	2	0.7367	0.0277	0.0901	0.0033	0.9714	560.5	55.5	555.9	42.3	579.3	10.4
20140716	Manangotry	30µmRR/5Hz/200nm	3	0.7144	0.0284	0.0883	0.0034	0.9809	547.4	56.9	545.3	44.3	556.1	8.6
20140716	Manangotry	30µmRR/5Hz/200nm	4	0.7214	0.0306	0.0889	0.0037	0.9766	551.5	61.2	548.8	47.3	562.5	10.2
20140716	Manangotry	30µmRR/5Hz/200nm	5	0.7199	0.0300	0.0887	0.0037	0.9890	550.6	60.0	548.1	47.0	561.1	6.9
20140716	Manangotry	30µmRR/5Hz/200nm	6	0.7355	0.0313	0.0904	0.0038	0.9859	559.8	62.7	557.8	48.9	567.8	8.1
20140716	Manangotry	30µmRR/5Hz/200nm	7	0.7161	0.0379	0.0878	0.0046	0.9817	548.4	75.5	542.5	58.6	572.6	11.5
20140716	Manangotry	30µmRR/5Hz/200nm	8	0.7184	0.0333	0.0873	0.0040	0.9848	549.7	66.5	539.4	51.3	592.6	9.6
20140716	Manangotry	30µmRR/5Hz/200nm	9	0.7143	0.0354	0.0873	0.0043	0.9925	547.3	70.6	539.3	55.2	580.6	7.0
20140716	Manangotry	30µmRR/5Hz/200nm	10	0.7111	0.0392	0.0872	0.0048	0.9890	545.4	78.1	539.3	61.2	571.0	9.3
		Reference age: 558 ± 3Ma (LA-MFC-ICP-MS), Horstwood et al. (2003)						**Weighted mean =**	**551.4**	**20.2**	**546.4**	**15.7**	**572.1**	**2.8**
20140716	Manangotry	30µm/2Hz/266nm	1	0.4992	0.0184	0.0660	0.0021	0.8853	411.1	37.0	411.8	27.7	407.5	14.0
20140716	Manangotry	30µm/2Hz/266nm	2	0.5083	0.0188	0.0666	0.0021	0.8527	417.3	37.8	415.7	27.0	426.0	16.4
20140716	Manangotry	30µm/2Hz/266nm	3	0.5119	0.0218	0.0666	0.0022	0.7662	419.7	43.7	415.7	28.0	442.0	24.2
20140716	Manangotry	30µm/2Hz/266nm	4	0.5116	0.0189	0.0676	0.0020	0.8059	419.5	38.0	421.4	25.9	409.1	17.9
20140716	Manangotry	30µm/2Hz/266nm	5	0.5120	0.0223	0.0673	0.0025	0.8585	419.8	44.9	419.7	32.4	420.5	18.8
20140716	Manangotry	30µm/2Hz/266nm	6	0.5088	0.0176	0.0677	0.0020	0.8430	417.6	35.5	422.3	25.5	392.0	14.6
20140716	Manangotry	30µm/2Hz/266nm	7	0.5092	0.0162	0.0672	0.0019	0.8960	417.9	32.6	419.5	24.7	409.3	11.6
20140716	Manangotry	30µm/2Hz/266nm	8	0.4802	0.0152	0.0634	0.0018	0.9125	398.2	30.7	396.4	23.6	409.1	10.6
20140716	Manangotry	30µm/2Hz/266nm	9	0.4814	0.0141	0.0628	0.0013	0.7323	399.0	28.5	392.8	17.4	435.2	17.4
20140716	Manangotry	30µm/2Hz/266nm	10	0.4846	0.0142	0.0641	0.0017	0.9142	401.2	28.7	400.3	22.2	406.7	9.7
		Reference age: 558 ± 3Ma (LA-MFC-ICP-MS), Horstwood et al. (2003)						**Weighted mean =**	**546.5**	**16.2**	**537.7**	**12.2**	**578.2**	**2.5**

Note: Dia.: diameter; Rep.: repetition rate; WL.: wavelength, 1SD: 1-standard deviation; 2SD: 2-standard deviation; bold face: weighted average and error; Ma: million years ago

Decay constant used for the age calculations were 9.8485×10^{-10} yr^{-1} for ^{235}U and 1.55125×10^{-10} yr^{-1} for ^{238}U.

Weighted mean was calculated by the following equation: $x \pm \sigma = [\Sigma(xi/\sigma i)^2]^{1/2}[\Sigma\ (1/\sigma i)^2]^{-1/2} \pm [\Sigma\ (1/\sigma i)^2]^{-1/2}$.