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ESM 3 (a) Summary SHRIMP data for standard zircon QGNG, analysed concurrently with the Bayan Obo samples. ^{232}Th measured as $^{248}ThO^{+}$, and "±" is the standard error. (b) Running order of data acquisition. (c-e) QGNG isochrons from three analytical sessions.

(a)

Spot	beam nA	248/204	±	208/204	±	Th ppm	Age	±
QG-1	3.8	111120	24529	3941.7	870.06	263.08	1777.1	8.5532
QG-2	3.9	74950	10374	2824.9	391.01	230	1844.6	9.2411
QG-3	3.6	146060	22155	5618	852.17	332.31	1840.3	8.2244
QG-4	3.5	127620	19824	4854.4	754.08	296.15	1857.9	8.2623
QG-5	3.4	113130	19017	4310.3	724.58	287.69	1854.8	7.4293
QG-6	3.8	65510	11522	2512.6	441.91	214.36	1864.8	10.435
QG-7	3.8	43746	6720.6	942.51	144.8	107.18	1848.8	21.316
QG-8	3.7	21493	3646.9	601.68	102.09	80.641	2076.2	29.364
QG-9	3.5	92607	11719	3086.4	390.57	278.21	1843.6	7.9007
QG-10	3.8	51867	7156.9	1623.4	224	194.87	1845.8	11.371
QG-11	3.8	33735	5310.4	1132.5	178.28	126.67	1857.6	29.856
QG-12	3.8	31781	3709.4	1051.5	122.73	126.67	1895.9	14.308
QG-13	3.7	242400	54883	9434	2136	322.56	1953.3	7.2702
QG-14	3.7	91430	14091	3584.2	552.41	218.21	1915.9	11.064
QG-15	3.7	345640	82089	12500	2968.7	351.03	1840.8	6.6297
QG-16	3.7	101710	20423	3937	790.5	180.26	1868.6	9.4642
Q17	3.1	126000	29551	4201.7	988.63	190.77	1742.3	7.3322
Q18	3.3	146000	31782	5050.5	1096.8	186.15	1862.1	7.4533
Q19	3.5	110000	31477	3831.4	1101	215.38	1839.2	9.6516
Q20	3.5	117000	25568	4444.4	967.9	233.33	1997.1	7.8756
Q21	3.5	45992	10489	1594.9	363.75	98.72	1842.5	13.798
Q22	3.5	85643	14274	2976.2	496.03	224.36	1850.4	7.6661
Q23	3.5	73050	13686	2341.9	438.77	179.49	1758.8	9.289
Q24	3.6	62906	11374	2232.1	403.58	193.85	1839.3	9.0073
Q25	3.5	124000	31409	3731.3	946.76	251.28	1677.4	8.293
Q26	3.6	187000	58427	6802.7	2128.7	230.77	1891.7	19.482
Q-27	8	156190	28165	5464.5	985.4	376.62	1787.3	9
Q-28	8	48078	9055.7	1712.3	322.53	132.92	1724.2	103.1
Q-29	8	278760	90964	10526	3434.9	324.92	1847.9	13.2
Q-30	7.9	99660	18027	3413	617.36	284.4	1850.1	8.5
Q-31	7.9	361780	102730	12346	3505.6	576.09	1770.5	7.1
Q-32	7.8	227390	55946	7936.5	1952.6	518.4	1800.9	7.6
Q-33	8	301910	54026	10526	1883.7	686.77	1819.6	6.2
Q-34	8	202490	30867	6097.6	929.51	561.23	1719.3	8.5
Q-35	8	215560	46305	7407.4	1591.2	420.92	1842.7	8
Q-36	8	226540	52278	7692.3	1775.1	376.62	1858.2	7.4
Q-37	8	217230	35121	5988	968.12	310.15	1814.7	24.9
Q-38	7.9	96619	16198	2941.2	493.08	255.23	1928	23.3
Q-39	7.9	151840	33743	5050.5	1122.3	306.28	1938.1	13.2

(b)

QGNG Standard	*Sample P7020*	*QGNG Standard*	*Sample P7021*	*QGNG Standard*	*Sample P7021*
Day 1, 20 micron spots		Day 2, 20 micron spots		Day 2, 30 micron spots	
QGNG 1		QGNG 17		QGNG 27	
	C1	QGNG 18		QGNG 28	
	C2		J16	QGNG 29	
QGNG 2			J17		C27
QGNG 3		QGNG 19			C28
QGNG 4		QGNG 20		QGNG 30	
	C3		J18	QGNG 31	
	C4		J19		C29
QGNG 5		QGNG 21			C30
QGNG 6				QGNG 32	
	C5	QGNG 22			
	C6		J20	QGNG 33	
QGNG 7			J21		C31
QGNG 8		QGNG 23			C32
	C7	QGNG 24		QGNG 34	
	C8		J22	QGNG 35	
QGNG 9			O23		C33
		QGNG 25			C34
			N24	QGNG 36	
QGNG 10			P25		E35
	C9		N26		E36
	C10	QGNG 26		QGNG 37	
QGNG 11					D37
QGNG 12					D38
	C11			QGNG 38	
	C12				D39
QGNG 13					D40
				QGNG 39	
QGNG 14					D41
	C13				D42
	C14				
QGNG 15					
QGNG 16					
	C15				

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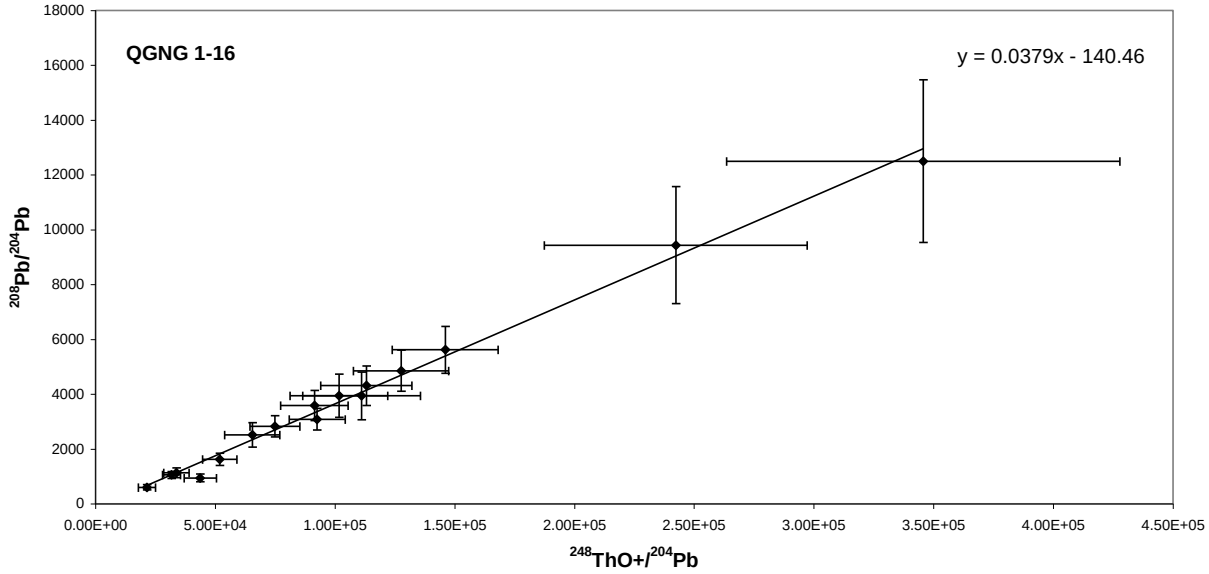
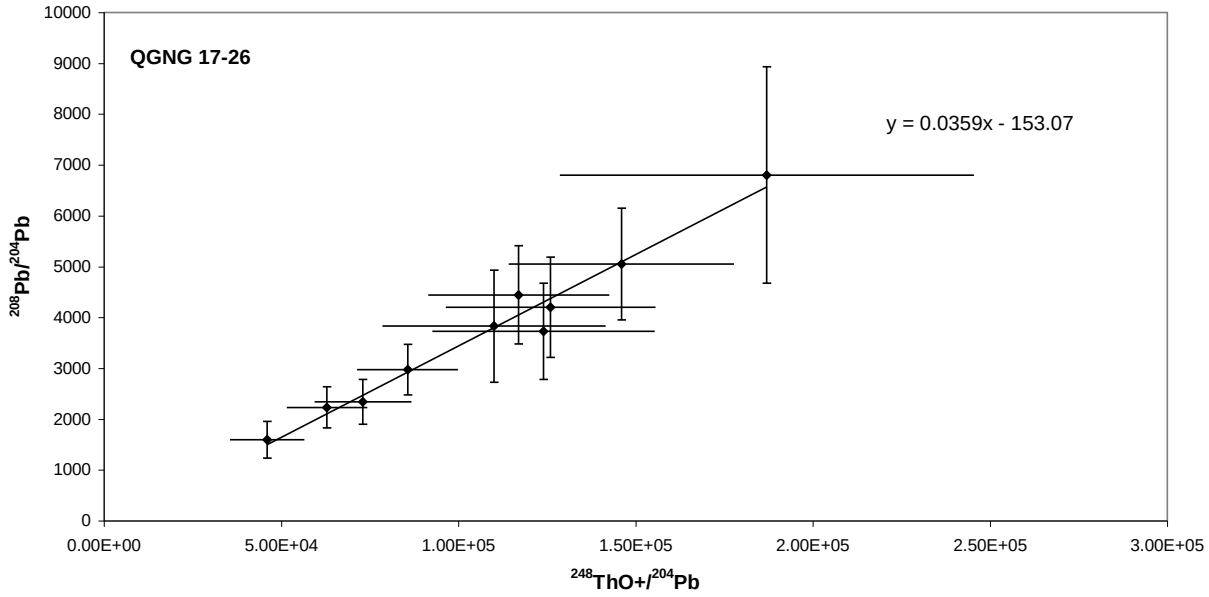
(c)



(d)



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(e)