Table S1: Typical operating parameters for Ti isotope measurement on MC-ICP-MS

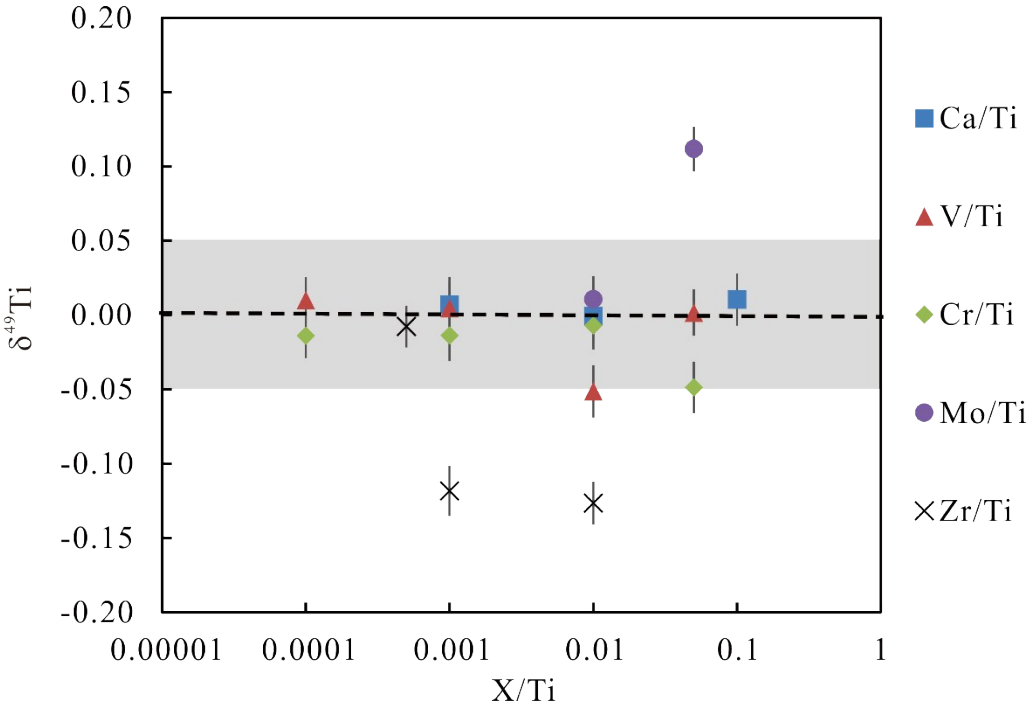
Parameter	Value
RF forward power	1205W (optimized daily)
Cooling gas	16.7 L/min
Auxiliary gas	1.1 L/min (optimized daily)
Sample gas	1.1 L/min (optimized daily)
Extraction	−2000 V
Focus	−726 V
Detection system	Nine Faraday collectors
Acceleration voltage	10 kV
Torch Setting	
X-pos	-2.9 mm
Y-pos	-2.7 mm
Z-pos	2.8 mm
Interface cones	Nickel
Spray chamber	Glass cyclonic
Nebulizer type	Micromist PFA nebulizer
Sample uptake rate	50 µL/min
Perri-pump	-12.75 rpn
Instrument resolution	4000 (moderate)
Integration time	4.194 s
Idle time	3 s

Table S2: Ti isotope compositions of Qinghu minerals

Sample	Mineral content wt%	TiO_2 wt%	$\delta^{49}Ti$	$\delta^{49}Ti_{OL\text{-}Ti}$	2SD	n
QH whole-rock		0.76	-0.761	0.309	0.020	2
QH K-feldspar	27.7	0.01	-0.541	0.529	0.042	2
QH hornblende	18.2	3.66	-0.725	0.345	0.044	2
QH plagioclase	47.2	0.02	-0.457	0.613	0.064	2
QH titanite		25.35	-0.924	0.146	0.008	2
QH ilmenite		44.38	-0.949	0.121	0.038	2
QH magnetite		1.48	0.586	1.656	0.050	2

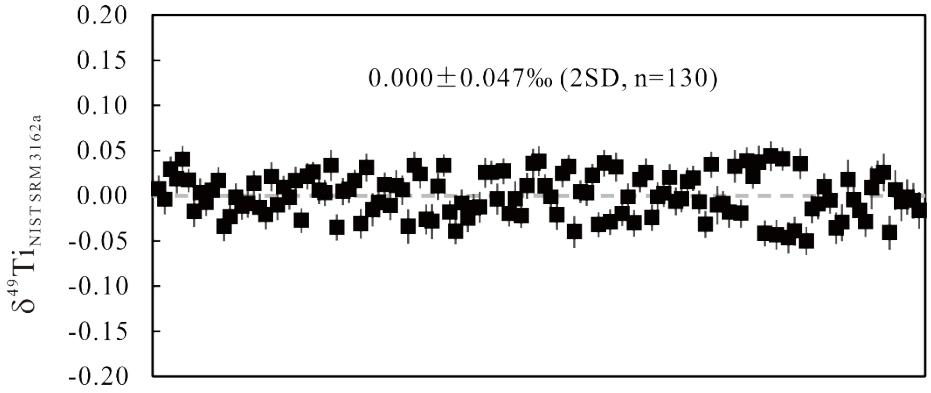
The data of Ti isotopic composition were represented part per mil deviation relative to NIST SRM 3162a Ti standard. For interlaboratory comparison, the values have been scaled onto the OL-Ti standard using the $\delta^{49}Ti_{OL\text{-}Ti}$ value of 1.070 ± 0.050‰ (2SD).

Fig. S1



The effect of matrix elements on $\delta^{49}Ti$ by adding different contents of Ca, V, Cr, Mo and Zr into NIST SRM 3162a. Error bars are the internal 2SE precision.

Fig. S2



Long-term stability of NIST3162a Ti isotope standard in the medium of 0.32 M HNO_3 + 0.0024 M HF. The average $\delta^{49}Ti_{NIST\ SRM\ 3162a}$ of 9 months measurements of NIST SRM 3162a was 0.000 ± 0.047‰ (2SD, n=130). Error bars are the internal 2SE precision.