A new appraisal of ilmenite U–Pb dating method by LA-SF-ICP-MS

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Supplementary Information

Table S-1 Mathematical equation for U–Pb data correction between standards and samples (Zircon 91500 or rutile RMJG as the primary standard).

$$R_{cor}^{sam} = R_{mea}^{sam} * R_{ref}^{std} * \{ 1/R_{mea1}^{std} * \left[1 - (t^{sam} - t_{mea1}^{std})/(t_{mea2}^{std} - t_{mea1}^{std}) \right] + 1/R_{mea2}^{std} * (t^{sam} - t_{mea1}^{std})/(t_{mea2}^{std} - t_{mea1}^{std}) \}$$

Note: R_{mea}^{sam} is the measured isotopic ratio of sample at time of t^{sam}, R_{cor}^{sam} is the corrected isotopic ratio of the sample, R_{ref}^{std} is the reference isotopic ratio of the primary standard, and R_{mea1}^{std} and R_{mea2}^{std} are the measured isotopic ratios of primary standard at times of t_{mea1}^{std} and t_{mea2}^{std}, respectively.

U–Pb isotopic ratios are corrected with standard-sample bracketing method. Zircon 91500 or other RMs was used as external standard, which was analyzed two times every 10 or 15 analyses of ilmenite samples, i.e. NIST612/NIST614 +2 91500+2 RMJG +2 PL-57 +2~3 YGX +10~15 samples+2 91500+2 RMJG +2 PL-57 +2~3 YGX + NIST612/NIST614 or NIST612/NIST614 +2 91500+2 RMJG +10~15 samples+2 RMJG +2 91500 + NIST612/NIST614. A short integrating time (~25 s) of external standard and samples were selected to correct the Pb/U fractionation and instrumental mass discrimination using ICPMSDataCal software. The U–Pb isotopic ratios of samples were calculated using a linear interpolation (with time) for every ten or fifteen analyses according to the variations of standard. Similar description of mathematical equation and the uncertainty calculation can be found in Luo et al.[21-22] and Tang et al.[31-32].