The rocks were crushed and pulverized using standard methods with a jaw crusher and disk mill. A Wilfley table was used to produce a concentrate of heavy minerals. Zircon grains were isolated using methylene iodide and a Frantz magnetic separator.

Prior to dissolution, zircon grains were chemically abraded to penetratively remove alteration zones where Pb loss has occurred (Mattinson, 2005). These zones correlate with areas of high U that have suffered radiation damage prior to alteration. To thermally anneal damaged lattice sites, grains were placed in a muffle furnace at ~1000 °C for up to 60 h. This was followed by partial dissolution in 50% HF and ~10 µl 8N HNO₃ in Teflon dissolution vessels at 195 °C for ~17 h. The grains were washed in 8N HNO₃ prior to dissolution. A mixed ⁰²⁰⁵Pb-²³⁵U spike was added to the Teflon dissolution capsules during sample loading. Zircon was dissolved using ~0.10 mL of concentrated hydrofluoric acid (HF) and ~0.02 mL of 8N nitric acid (HNO₃) at 195 °C (Krogh, 1973) for ~5 days, dried to a precipitate, and re-dissolved in ~0.15 mL of 3N hydrochloric acid (HCL).

U and Pb were isolated from the zircon solutions using anion exchange chromatography, dried in dilute phosphoric acid (H₃PO₄), and deposited onto outgassed rhenium filaments with silica gel (Gerstenberger and Haase, 1997). Pb was analyzed with a VG354 mass spectrometer in dynamic mode with a Daly pulse-counting system. U was measured using the Daly detector or in static mode using three Faraday collectors. The dead time of the Daly measuring system for Pb and U was 16.5 and 14.5 ns, respectively. The mass discrimination correction for the Daly detector is constant at 0.05%/atomic mass unit. Daly characteristics were monitored using the SRM 982 Pb standard. Thermal mass fractionation for Pb and U was 0.1% per atomic mass unit. The total amount of common Pb in each zircon analysis was attributed to laboratory Pb (corrected using an isotopic composition of ²⁰⁶Pb/²⁰⁴Pb of 18.49 ± 0.4%, ²⁰⁷Pb/²⁰⁴Pb of 15.59 ± 0.4%, ²⁰⁸Pb/²⁰⁴Pb of 39.36 ± 0.4%; 2σ uncertainties), thus no correction for initial common Pb from geological sources was made. Routine testing indicates that laboratory blanks for Pb and U are usually less than 0.5 pg and 0.01 pg, respectively. Corrections to the ²⁰⁶Pb/²³⁸U and ²⁰⁷Pb/²⁰⁶Pb ages for initial ²³⁰Th disequilibrium were made assuming a Th/U ratio in the magma of 4.2. Decay constants are those of Jaffey et al. (1971). All age errors quoted in the text and figure, and error ellipses in the concordia diagrams are given at 2σ. Plotting and age calculations are from Isoplot/Ex 3.00 (Ludwig, 2003).
REFERENCES CITED


