Dating a Variscan pressure - temperature loop with staurolite

R. Frei
Gruppe Isotopengeologie, Mineralogisch-Petrographisches Institut, Universität Bern,
Erachstr. 9a, CH-3012 Bern, Switzerland

G.G. Biino, C. Prospert
Institut de Minéralogie et Pétrographie, Université Fribourg, Pérolles, CH-1700
Fribourg, Switzerland

Additional specifications on sample preparation and analytical techniques

Two single staurolite crystals of about 12 by 7 by 4 mm were selected for the analyses. Both crystals showed the simple zonation described in the text. Rim (r) and core (c) were separated from each other using a miniature diamond saw device usually used for the preparation of inclusion thin slabs. The other crystal was treated as a bulk sample (t) and both U and Pb were measured. The separates were first crushed by hand in an agate mortar to grain sizes between 40 and 150 μm. Quartz, muscovite, biotite, fibrolite, garnet, and other minor solid inclusions were separated from staurolite by means of heavy liquids and subsequent hand picking. The garnet separate was obtained from crushed bulk staurolite-bearing metasediment. After ultrasonic cleaning in acetone and triply distilled H₂O, the concentrates, each weighing between 200 and 300 mg (in the case of garnet, 100 mg), were then stepwise leached with acids listed in Table 1 following a slightly modified procedure described in Frei and Kamber (1995). The final step [4] consisted of total dissolution of the residual. For the total bulk staurolite sample [t] each leach solution was aliquoted and ~1/3 of the total leach
volume was spiked with a mixed $^{208}\text{Pb}$-$^{235}\text{U}$ tracer to determine the concentrations. U and Pb were separated on 0.5 ml quartz-glass columns charged with DOWEX AG 1x8 © anion exchange resin using conventional HBr-HCl-HNO$_3$ recipes. Total Pb procedure blanks amounted to $\sim$150 pg, whereas a U blank of <20 pg was added. Pb was statically measured on a VG Sector multicup mass-spectrometer using zone-refined 20 $\mu$m Re filaments and a silica gel - H$_3$PO$_4$ loading technique. U was analyzed on a single-cup AVCO mass-spectrometer from triple Ta-Re-Ta filaments. Fractionation of Pb amounted to 0.85 $\pm$ 0.13 %o / AMU, calculated from 85 analyses of the NBS 981 Pb standard during the past two years in our laboratory. Calculation of the final $^{206}$Pb/$^{207}$Pb, $^{207}$Pb/$^{204}$Pb ratios and the error correlations followed the procedure of Ludwig (1980). Isochrons were calculated with ISOPLOT v 2.03 (Ludwig, 1990).

REFERENCES CITED
