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Chemical procedures of U and Pb extraction from garnet, tourmaline and columbite for U-Pb dating.

E. Apanasevich
(apalena@mail.ru)

U-Pb garnet, tourmaline and columbite dating represents a complicated procedure. A series of chemical procedures described in Manhes, 1984; Tilton, 1973; Jung&Mezger, 2003; de Wolf, 1994; Mattinson, 1986, was been tested to create a blended one that has been successfully applied at the laboratory.
Garnets should preliminary be treated with hot hydrochloric acid (6 mol/l HCl) that dissolves monazite, the garnet-accompanying mineral. Then, samples are decomposed in a mixture of HF – HNO3 in teflon combs (Krogh, 1973) for at least 48 hours. To remove resultant fluorides, samples are to be treated first with nitric acid (7 mol/l HNO3), and then with hydrochloric acid (6.2 mol/l HCl and 3.1 mol/l HCl). Dissolved sample is divided into two aliquots, with one being mixed with a blended 208 Pb – 235 U tracer. Lead and uranium are separated using AG 1-X8 anion-exchange tar and conventional method (Krogh, 1973). To recover cleaner lead that is quite important in mass-spectrometric investigations, the purification procedure is realized twice.
To carry out U-Pb columbite and tourmaline dating, dissolved sample is divided into two aliquots after it has been dissolved in hydrofluoric acid in order to avoid possible U and Pb fractionation in a solution before adding a tracer. Then, lead and uranium are separated using AG 1-X8 anion-exchange tar and conventional HBr-HCl-HNO3-H2O method (Tilton, 1973), realizing the purification twice.