COMPOSITION AND U-Th-Pb AGES OF MONAZITE INCLUSIONS IN PYROPE MEGACRYSTS FROM THE UHP UNIT OF THE DORA MAIRA MASSIF, W ALPS

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The well known pyrope megacrysts of the UHP Brossasco-Isasca Unit (BIU) have a complex and varied suite of mineral inclusions. Most important for geochronology are the zircon inclusions of the Case Ramello (Parigi) outcrop where CHOPIN (1984) first identified coesite inclusions in the pyrope megacrysts. Zircon inclusions from this locality gave U-Pb ages of ca. 38 Ma for the UHP metamorphism (TILTON et al., 1991), further refined to ca. 35 Ma with the SHRIMP technique (GEBAUER et al., 1997).

In this contribution first results of an investigation on the composition and U-Th-Pb age of monazite inclusions from the outcrop of pyrope megacrysts at Case Tapina, Vallone di Gilba (COMPAGNONI et al., 1994) are described.

Major-element composition of monazite was determined by WDS-EPMA, while trace elements and the U and Pb concentrations were measured by μ-PIXE. The Tapina monazite is Ce- and Th-rich, with ThO_2 ranging from 7 to 11 wt%. Variations in Th concentration are accompanied by changes in LREE contents (Ce_2O_3: 26 - 30 wt%; La_2O_3: 10.5 - 13.5 wt%; Nd_2O_3: 10.5 - 12 wt%). U and Pb concentrations range between 500 and 2000 ppm, and from 100 to 250 ppm, respective- ly. Y and Sr are also present, at the thousand ppm level.

Because monazite contains significant amounts of Th and U, with little or no common Pb, it can be used for U-Th-Pb dating from the measured concentrations of U, Th and Pb. Two groups of ages were calculated for a Tapina monazite crystal: Ages from a homogeneous, high Th rim cluster around 35 Ma, while ages from a heterogeneous, low Th core with patchy zoning cluster around 60 Ma but a couple of outliers yield ca. 75 Ma. U-Th-Pb data on a larger sample set will try to clarify the significance of the two older age groups.

References

CHOPIN, C. (1984): Contrib. Mineral. Petrol., 86, 107-118.

COMPAGNONI, R., HIRAJIMA, T., TURELLO, R. & CASTELLI, D. (1994): - In: COMPAGNONI, R. & MESSIGA, B. (ed.) - Guide-book to the field excursion B1, 16th General Meeting of the International Mineralogical Association, September 10-15, Pisa, Italy, 87-105.

GEBAUER, D., SCHERTL, H.-P., BRIX, M. & SCHREYER, W (1997): Lithos, 41, 5-24.

TILTON, G.R., SCHREYER, W. & SCHERTL, H.-P (1991): Contrib. Mineral. Petrol., 108, 22-33.