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Precambrian granites of Karelia and Ukraine: preliminary monazite EMP ages

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Granitoids of the Precambrian shields in Karelia and Ukraine have rather simple post-magmatic histories and ages previously well constrained using isotopic methods, thus they provide useful and convenient testing materials for the monazite chemical dating method. Monazite has been found as a fairly common accessory mineral in many of these granitoids, easily detectable in polished thin sections using BSE and EDS techniques. The quantitative WDS electron microprobe (EMP) analyses were performed in several laboratories (at universities of Wroclaw, Oxford, Bochum and Warsaw) and the results provided a unique opportunity of interlaboratory correlation of the data obtained on the same samples.

Several granitoid bodies in the Paleoproterozoic Svekofennian belt in the Viborg-Priozersk zone in Karelia, at the NE and N side of Lake Ladoga (the Borodinski, Zavetinski, Gory, and Kuznechenski massifs) have been examined. They all belong to the group of late-orogenic granitoids, represented mainly by granodiorites and granites. According to the published geochronological data, obtained mostly by conventional U-Pb multi-grain zircon dating techniques, the ages of the granites fall within the range of 1800-1860 Ma. Our microprobe chemical dating yielded the following ages: Borodinski granite = 1787$\pm$17Ma (11 points in four grains), Kuznechenski granite = 1846$\pm$21 Ma (11 points in four grains).

Precambrian granitoids of the Ukrainian Shield represent several stages of magmatic activity in the East European Craton. We sampled 15 localities in 9 selected granitoid

complexes across the whole area of the Ukrainian Shield, including the Novoukrainski Massif (2020-2080 Ma, published U-Pb isotope ages) and the Kirovogradski Massif (1850-2100 Ma).

The presence of monazite was revealed in 6 of total 19 sectioned specimens. Our monazite EMP ages from two selected granitoid bodies are: Kapustinski granite (Novoukrainski Massif) = 2048±26 Ma (18 points in six grains) and Krupski granite (Kirovogradski Massif) = 2067±33 Ma (12 points in four grains).

The monazite microprobe chemical ages obtained fit well with the published conventional U-Pb isotope zircon ages. The analytical precision is usually fairly good (in the range of 10-30 Ma). Populations of monazite in the studied rocks are mostly age-homogeneous in spite of the observed zonation in BSE images. Our studies generally confirm many advantages of the monazite chemical dating method, however, a careful and critical analytical approach is always crucial for obtaining reliable results.

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