DISTRIBUTION OF TRACE ELEMENTS BETWEEN MAJOR AND ACCESSORY MINERALS IN A MOLDANUBIAN QUARTZ MONZODIORITE FROM LOWER AUSTRIA

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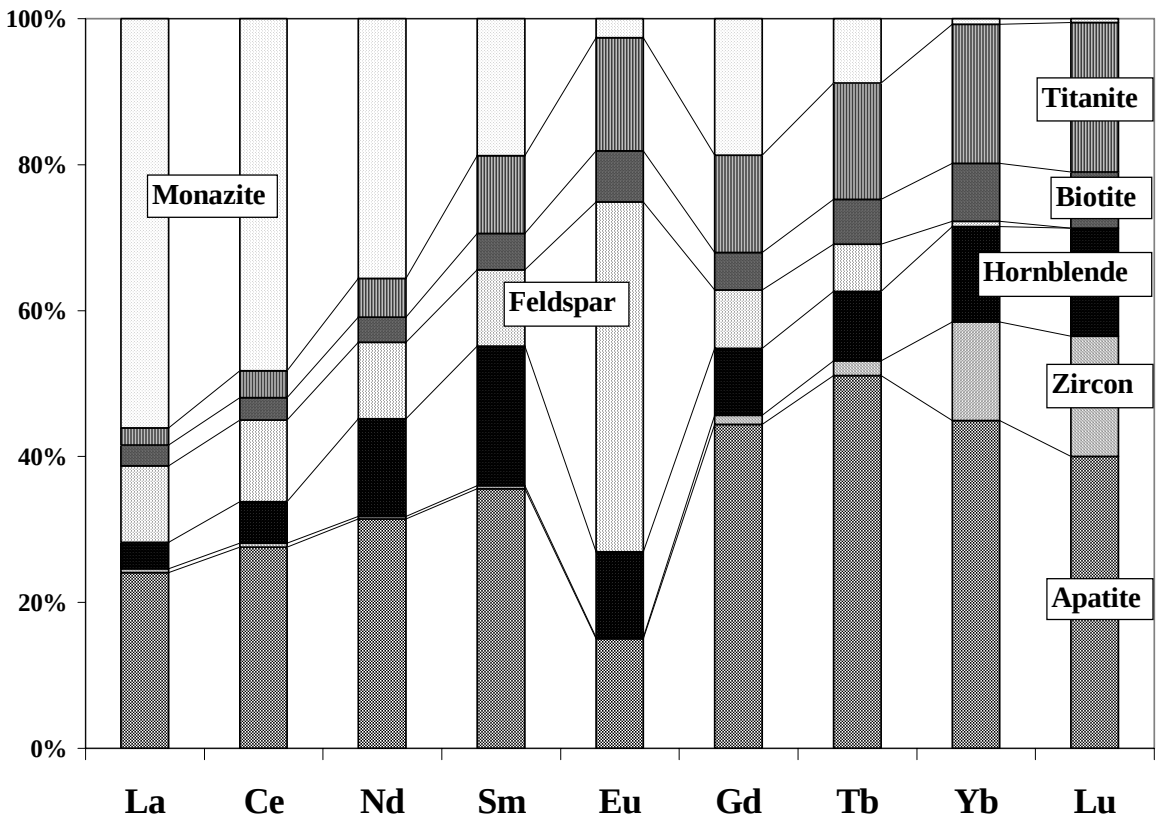
Pure fractions of biotite, plagioclase, K-feldspar, hornblende, titanite, apatite, zircon and monazite were separated from a sample of the Gebharts quartz monzodiorite, Lower Austria, and systematically analyzed by INAA technique. Additionally, a whole rock analysis was performed, and the modal composition of the sample was precisely determined by point counting under the microscope and in the BSE image.

The aim was to investigate what percentages of the different trace elements are trapped by different mineral groups. Information of this kind provides a realistic basis to understand and model chemical effects of crystal fractionation in evolving plutonic suites.

It was found that the trace element systematics of the quartz monzodiorite is largely controlled by accessory minerals. Important exceptions are the elements Rb, Cs, Ba, Eu, Sc, Co, Cr. Rb, Cs, Ba which are hosted by biotite (dominantly) and by the feldspars. Sc and Cr are contained in biotite (dominantly) and hornblende. Co is mainly trapped in feldspar (ca. 40 %) and biotite (ca. 30 %). The REE budget is shown in Fig.1. Monazite and apatite are the major carriers of the LREEs; apatite, titanite and zircons contain the bulk of the HREEs. 50 % of the total Eu content is found in feldspar. About 80 % of the Th is incorporated in monazite; U is distributed between monazite, titanite and zircon (ca. 30:30:10 %). Hf is up to 60 % in zircon and up to 40 % in titanite.