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PETROGRAPHY OF GRANITOIDS FROM BOREHOLES WIGANCICE-1 AND DĘBOWIEC-1 (S PART OF THE STRZELIN CRYSTALLINE MASSIF, SW POLAND)

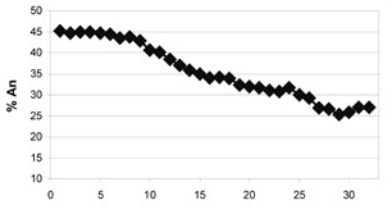
INTRODUCTION

The Strzelin Crystalline Massif is situated in the southern part of Fore Sudetic Block (SW Poland). Crystalline rocks usually occur as small exposures therefore many important information about history of the Massif must be obtained from borehole material. This paper focuses on rocks from two boreholes in neighbourhood of Wigancice, in southern part of the Massif. The boreholes are at 5 km distance from each other.

Wigancice boreholes consist mainly of granitoids and they lack surrounding rocks. This characteristic is unusual comparing to other described drilled material. Cenozoic sediments form uppermost parts of the boreholes. Several types of granitoids were distinguished according to drill documentation. Detailed observation led to simplified division into three types of granitoids: (1) granodiorites (dominating type) and subordinate (2) tonalites and (3) two mica granites. The whole section is crosscutted by numerous pegmatites.

PETROGRAPHY

Granodiorites are medium- to coarse-grained and locally exhibit parallel alignment of minerals. They consist of quartz, plagioclase, K-feldspar, biotite, amphibole and accessory apatite, titanite and zircon.



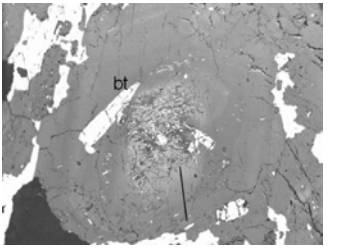


Fig.1. BSE image of type 1 plagioclase grain from granodiorite and corresponding traverse showing anorthite content (from core to rim)

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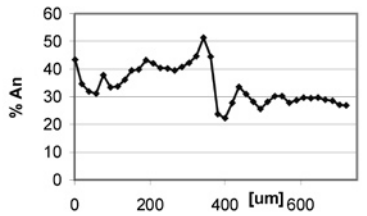
Plagioclases are commonly normally zoned (45% An in the core to 25% An in the rim) with slight oscillations (Fig.1). Inner parts of the cores are often strongly altered. Small inclusions of biotite occur in the mantles. Several grains exhibit different zonation style with reversely zoned cores (30% An in the inner core and 51% An in outer core) and constant anorthite content in the mantle (27% - 30% An, Fig. 2).



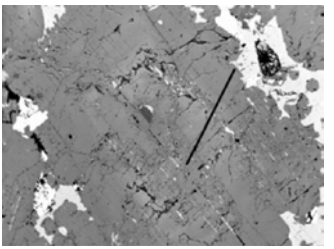
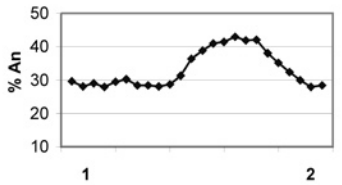
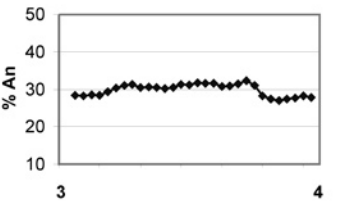


Fig.2. BSE image of type 2 plagioclase grain from granodiorite and corresponding traverse showing anorthite content (from core to rim)

Mafic minerals (biotite and amphibole) occur as aggregates or as individual grains. Biotite is characterized by slight decrease of Al^{IV}, Ti and $Mg/(Mg+Fe^{tot})$ from the cores towards the rims. Amphibole grains consist of Fe-hornblende and Mg-hornblende cores and thin actinolite rims.

Tonalites are fine- to medium-grained, consist of plagioclase, quartz, biotite, amphibole, K-feldspar and apatite, titanite and zircon as accessories.





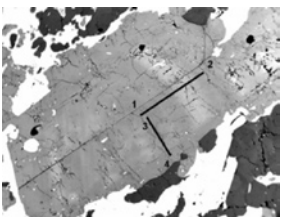


Fig. 3. BSE image of large plagioclase grain from tonalite and corresponding traverses showing anorthite content.

Two types of plagioclase grains occur: large and small ones. Large grains of plagioclases are characterized by complex zonation (Fig. 3). The poor in anorthite (29-33%) cores are surrounded by mantles richer in anorthite (43%). Anorthite content decreases again towards the rim to 28%. Small plagioclases are normally zoned from 39% An to 33% An.

Biotites form large aggregates up to 4 mm. Al^{IV} in biotites increases from the cores to the rims by 0.2 in average. Slight increase in Ti content is also noted in the same direction. Amphiboles consist of Fe-hornblende cores, Mg-hornblende mantles and rims (Mg content increases towards the rims).

The granites are fine-grained and consist of quartz, K-feldspar, plagioclase, muscovite and biotite.

CONCLUSIONS

Boreholes are drilled probably in one intrusion composed mainly of grandiorite but shape and size of the body is not constrained. The size of the intrusion is confined from the north as in boreholes localized 5 km to the north near Bożnowice village approximately 60% of surrounding rocks were drilled (Beyer 2002).

Only scarce contacts between granodiorites and tonalites were found but structural characteristics of both rocks together with previously described relationships (Oberc-Dziedzic, personal communication) indicate that tonalite forms veins crosscutting granodiorite. Two-mica granite crosscuts granodiorite and is supposedly the youngest rock type as it was described from field relations and dating in other parts of Strzelin Crystalline Massif (Oberc-Dziedzic et al. 1996, Oberc–Dziedzic 1999).

Normal zonation in type I plagioclases from granodiorite and crystallization of biotite and amphibole after plagioclase (structural evidence, Fig 1) indicates their crystallization in steadily cooled magma body progressively enriched in water (e.g. Naney 1983). Occurrence of second scarce type of plagioclase grain with reversely zoned cores suggests different, more complex origin of their formation, and then mixing of two types of grains in one magma reservoir.

Chemical compositions of minerals from tonalite (increase in An content towards the mantles in plagioclases, increase in Al^{IV} and Ti in biotites) indicate crystallization event in differentiating magma prior to emplacement into granodiorite sequence.

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