

Kontinentales Tiefbohrprogramm der Bundesrepublik Deutschland

The genesis of redwitzite near the KTB-drilling site

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Introduction

"Redwitzite" is not an exactly defined rock type. The term comprises a group of magmatic rocks, which are genetically related. Their compositional range is from gabbro to granodiorite. The type locality near Marktredwitz is 40 km north of the KTB drilling site (fig. 1).



Fig. 1. Geological sketch map of north-eastern Bavaria. The working area near Windscheschenbach and the type locality of redwitzite near Marktredwitz are indicated by bold lines.

Geochemistry

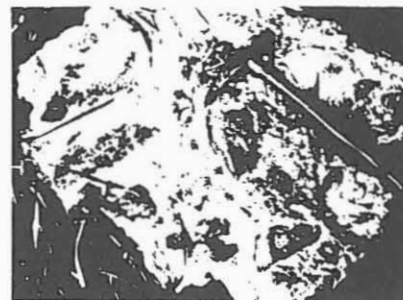
In the Murr-Ilsenbach area the redwitzite ranges from quartz monzonite to monzogabbro (according to the nomenclature of DE LA ROCHE et al., 1980). The chemical compositions gradually pass into those of the Leuchtenberger granite (fig. 5). They also fit into the compositional range of the rocks from the type locality (fig. 6).

Conclusions

- 320 Ma ago eastern Bavaria was a region of basaltic and granitic magmatism.
- In the Murr-Ilsenbach area the basaltic magma was modified towards an intermediate composition prior to emplacement. Primitive basaltic compositions have not been found until now.
- The two magmas mixed in the presently exposed level of intrusion.
- The compositional range of the redwitzite is at least in part the result of the mixing process. This is suggested by
 - the mutual relations between granite and redwitzite in many outcrops (figs. 2-4).
 - the linear relationships in Marker diagrams (fig. 5).
 - enology with the type locality where magma mixing is very likely to have occurred (fig. 6), (MIESSLER and PROPACH, 1987, HOLL et al., 1988).

Literature

de la Roche H., et al. (1980): Chem. Geol. 129, 183
 Holl, P.K. et al. (1988): in press
 Köhler H. und D. Müller-Sohnius (1976): N. Jb. Miner. Mh., 354
 Nadel J. (1968): Diss. Univ. München
 Miessler C. und G. Propach (1987): Fortschr. Miner. 65, Bn. 1, 137



Figs. 2 and 3. Enclaves of redwitzite in granite. The white dots within the enclaves are xenocrysts which have been incorporated from the granite magma.



Fig. 4. Redwitzite with xenocrysts and small xenoliths of granite. The specimen was taken from a 2 m large boulder, i.e. it is not an enclave (at least not an enclave of the usual dm-size).

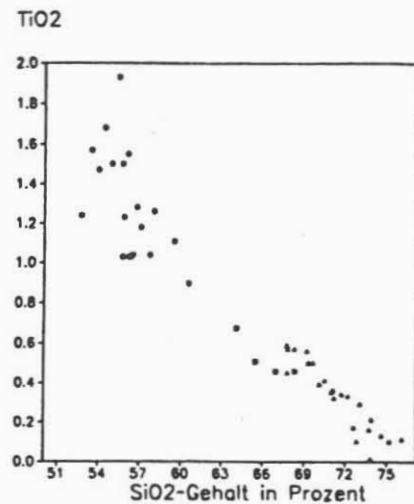


Fig. 5. TiO₂ versus SiO₂. Full circles: redwitzite. Squares: granite, sampled near redwitzite. Triangles: granite (Leuchtenberger granite), samples collected by MADEL (1968) in greater distance from redwitzite.

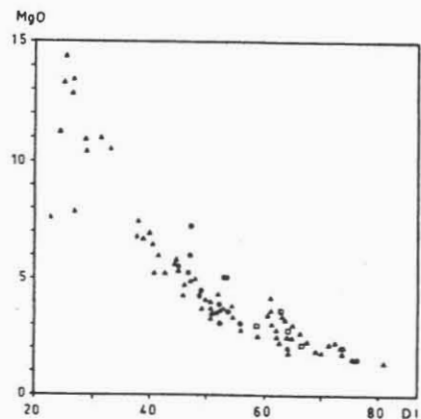


Fig. 6. MgO versus differentiation index. Full circles: redwitzite from Murr-Ilsenbach. Squares: granite from Murr-Ilsenbach. Triangles: redwitzite from Marktredwitz.

An area of 14 km², immediately southeast of Windscheschenbach, has been mapped by Thomas Goebel (Diplomarbeit, Institut für Mineralogie und Petrographie, Universität München, 1987). Between the villages of Murr and Ilsenbach the area comprises one of the few larger occurrences of redwitzite. This poster reports geological observations and geochemical data on the redwitzite and presents conclusions regarding the genesis of the redwitzite.

Geology

The redwitzite is closely associated with a porphyritic Variscan granite, the so-called Leuchtenberger Granite (321 ± 5 Ma, KÖHLER and MÜLLER-SOHNIS, 1976). There is not largescale, sharp contact between the two rock types. Typical relations between these rocks are:

- Inclusions (enclaves) of redwitzite within the granite (figs. 2 and 3). The inclusions are roundish in shape and have differing modal compositions.
- Relics of granite minerals dispersed within the redwitzite (fig. 5).

In both of these textural relations the redwitzite is fine-grained. Larger, homogeneous masses of redwitzite are medium-grained.