MITT.ÖSTERR.MINER.GES. 146 (2001)

PETROLOGY OF MANGANESE SILICATE-CARBONATE ROCKS FROM THE VEITSCH MN-DEPOSITS, GREYWACKE ZONE, EASTERN ALPS

by

P. Tropper[1], F. Bernhard[2] & W. Postl[3]

[1]Institute of Mineralogy and Petrography
University of Innsbruck, Innrain 52, A-6020 Innsbruck
[2]Institute of Engeneering Geology and Applied Mineralogy
Technical University of Graz, rechbauerstrasse 12, A-8010 Graz
[3]Referat für Mineralogie
Landesmuseum Joanneum, Raubergasse 10, A-8010 Graz

Within the Upper Austroalpine Greywacke Zone several carbonate-hosted Fe and Mn ore deposits occur. The Mn deposits of Veitsch at Kaskogel and south-east of Friedelkogel consists of lens-shaped Mn-carbonate bodies of up to 1.5 m thickness which are thought to have formed by syn-sedimentary processes. (HADITSCH, 1968). The primary manganese minerals described from these deposits are: rhodochrosite, tephroite, pyroxmangite, rhodonite, spessartine, Mn-chlorite, Mn-humite (manganhumite or sonolite) friedelite and jacobsite. (HADITSCH, 1968, POSTL et al., 1998). Sulfides such as sphalerite, galena, chalcopyrite and Co-Ni sulfides also occur. In addition, POSTL et al (1998) and NIEDERMAYR et al. (2000) described rare minerals such as helvine and sussexite from these deposits.

During this investigation, four samples of manganese silicate-carbonate rocks were studied. The sample from Kaskogel contains the mineral assemblage: tephroite + spessartine + rhodochrosite + Mn-chlorite + Mn-humite + friedelite. The three samples from Friedelkogel contain the mineral assemblages: Mn-humite + Mn-chlorite + rhodochrosite, Mn-humite + jacobsite + rhodochrosite and Mn-humite + jacobsite + rhodochrosite. All minerals grow in a matrix of rhodochrosite. In the sample from Kaskogel, tephroite grows along veins. Tephroite has a composition of $Teph_{92}Fo_7Fa_1$ and shows replacement by friedelite, which contains up to 3 wt.% Cl. The garnets also grow along veins, where two stages of garnet growth can be observed. The second stage appears as a replacement of the first garnet generation. Chemically, the garnets show a homogeneous first generation in the cores with a composition of $Sps_{97}Grs_2Andr_1$. The second garnet generation at the rims has slightly higher CaO contents and a composition of $Sps_{92}Grs_7Prp_{0.5}Andr_{0.5}$.

Based on experimental investigations in the system Mn-Al-Si-O (ABS-WURMBACH & PETERS, 1999) and the system $MnO-SiO_2-CO_2-H_2O$ (PETERS et al., 1973) it is possible to place $T-X(CO_2)-f(O_2)$ constraints on the assemblage tephroite + rhodochrosite + spessartine. The formation of tephroite probably took place around 400 - 450°C under low $X(CO_2)$ of < 0.02 and negligibly low $f(O_2)$. These data are in accordance with pre-Alpine greenschist facies P-T estimates from the Greywacke zone of 300 - 400°C and 3 - 5 kbar (NEUBAUER et al., 1999).

References

ABS-WURMBACH, I. & PETERS, T. (1999): Eur. J. Mineral. 11, 45-68.

HADITSCH (1968): Arch. F. Lagerstättenforsch. 7, 112-169.

NEUBAUER et al. (1999): Schweiz. Mineral. Petrogr. Mitt. 79, 41-62.

NIEDERMAYR et al. (2000): Carinhia II 190/110, 181-224.

PETERS, T., SCHWANDER, H. & TROMMSDORFF, V. (1973): Contrib. Mineral. Petrol. 42, 325-332.

POSTL, W., BERNHARD, F. & HOFER, F. (1998): Mitt. Abt. Miner. Joanneum 62/63, 59-64.