

**LARGE "GAHNITES" FROM NEAR OKAHUA, NAMIBIA:  
ONLY FE- AND ZN-BEARING SPINELS**

by

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Gahnite, ideally  $\text{ZnAl}_2\text{O}_4$ , is a Zn-dominant member of the spinel group, and a typical mineral in metamorphic and pegmatitic rocks. Recently, large (up to about 3 cm) blackish green "gahnite" crystals were reported from a private claim near Okahua about 30 km southeast of Otjiwarongo, central Namibia [1]. The host rocks are part of complex Precambrian metasediments consisting of marbles, calc-silicate rocks, quartz schists and chlorite-biotite schists, which are intruded by pegmatites and aplites [1].

Samples of "gahnite" and associated minerals, collected in September 2000 with the kind permission of the claim holder ("Namibia Minerals"), were investigated using single-crystal and powder X-ray diffraction, SEM-EDS, as well as IR and Raman spectroscopy. Large, blackish green octahedral "gahnite" crystals, associated with coarse-grained calcite, diopside, phlogopite and pale yellow forsterite, contain major Mg and Al, and minor amounts of Fe and Zn (1.0 - 1.3 wt.% ZnO). Their idealised empirical formula is  $(\text{Mg}_{0.81}\text{Fe}^{2+}_{0.17}\text{Zn}_{0.02})(\text{Al}_{1.9}\text{Fe}^{3+}_{0.1})\text{O}_4$ , and, consequently, they are Fe- and Zn-bearing spinels. IR spectroscopic investigations of a 0.5 mm thick polished platelet of a larger crystal showed nearly total absorption in the region between 10000 and  $400\text{ cm}^{-1}$  with only one small transparent region just before lattice vibrations cut off the transmitted light. This confirms the presence of both  $\text{Fe}^{3+}$  and  $\text{Fe}^{2+}$ .

In addition, small subhedral "gahnite" crystals, embedded in a dolomite marble and accompanied by orange subhedral clinohumite, have been collected from an outcrop about 30 m above the occurrence of the large spinels. Compared to the large octahedra, the small crystals have even less Zn being sometimes under the EDS detection limit ( $< 0.2\text{ wt.}\% \text{ ZnO}$ ). Traces of manganese were detected in these tiny crystals that show a violet tint and are transparent under the binocular. Their Mg content is slightly higher and they contain less Fe than the large crystals.

Other minerals identified from the occurrence are meionite-dominant scapolite, wollastonite, titanite and epidote. The first two occur in narrow white veinlets. The chondrodite reported from the locality [1] has not been confirmed so far. Further studies are underway.

**References**

- [1] PALFI, A. G. & WARTHA, R. (2001): Das Gahnit-Vorkommen bei Okahua. In BAHMANN, U. & BAHMANN, A. (Eds.), Namibia – Zauberwelt edler Steine und Kristalle, Bode-Verlag, Haltern, Germany, pp. 140-142. (in German).