Zincgartrellite

$Pb(Zn,Fe,Cu)_2(AsO_4)_2(H_2O,OH)_2$

TRICLINIC

Locality: The Tsumeb mine, Tsumeb, Namibia.

Occurrence: From material mined during 1975–1980 and purchased by G. Tremmel. Associated minerals are: chalcocite, wulfenite, duftite, "β-duftite" (calcian conichalcite), "cupro-adamite" and olivenite.

General appearance: Aggregates (up to 0.5 mm) made up of tabular crystals (<0.1 mm).

Physical, chemical and crystallographic properties: *Luster*: given as vitreous, but the indices of refraction indicate adamantine. *Diaphaneity*: transparent to translucent. *Color*: green-yellow. *Streak*: yellow. *Luminescence*: nonfluorescent. *Hardness*: 4½. *Tenacity*: brittle. *Cleavage*: none observed. *Fracture*: not determined. *Density*: could not be measured, 5.37 g/cm^3 (calc.). **Crystallography**: Triclinic, $P\bar{1}$, *a* 5.550, *b* 5.620, *c* 7.621 Å, α 68.59°, β 69.17°, γ 69.51°, *V* 200.1 Å^3, *Z* = 1, *a*:*b*:*c* = 0.9875:1:1.3560. Morphology: {111}, tabular on {111}. Twinning: none mentioned. **X-ray powder-diffraction data**: 4.731 (74) (011), 4.669 (86) (101), 3.283 (89) (012), 3.252 (91) (102), 3.185 (66) ($1\bar{1}0$), 2.999 (100) ($11\bar{1}$), 2.894 (74) ($\bar{1}11$), 2.880 (70) ($1\bar{1}1$), 2.535 (65) ($10\bar{2}$, 120, $01\bar{2}$, 020) (Krause *et al.* 1998). **Optical data**: Biaxial (–), α 1.91, β 1.94 (calc.), γ 1.97, 2*V*(meas.) 87°, dispersion not determined; pleochroism weak, *X* = *Z* pale yellow, *Y* yellow; orientation not determined. **Chemical analytical data**: Mean of sixteen sets of electron-microprobe data: PbO 33.49, CaO 0.35, CuO 6.26, NiO <0.05, CoO <0.05, ZnO 11.40, Al_2O_3 0.26, Fe_2O_3 7.23, As_2O_5 34.72, SO_3 0.13, H_2O (4.3), Total (98.62) wt.%. Empirical formula: $(Pb_{0.99}Ca_{0.04})_{\Sigma 1.03}$ $(Zn_{0.92}Cu_{0.52}Fe_{0.60}Al_{0.03})_{\Sigma 2.07}$ $[(AsO_4)_{1.99}(SO_4)_{0.01}]_{\Sigma 2.00}[(OH)_{0.82}(H_2O)_{1.16}]_{\Sigma 1.98}$. **Relationship to other species**: It is a member of the tsumcorite group, specifically the Zn-dominant analogue of gartrellite.

Name: Denotes the relationship with gartrellite and the dominance of zinc.

Comments: IMA No. 1998–014.

EFFENBERGER, H., KRAUSE, W., BERNHARDT, H.-J. & MARTIN, M. (2000): On the symmetry of tsumcorite group minerals based on the new species rappoldite and zincgartrellite. *Mineralogical Magazine* **64**, 1109-1126.

KRAUSE, W., BELENDORFF, K., BERNHARDT, H.-J., MCCAMMON, C., EFFENBERGER, H. & MIKENDA, W. (1998): Crystal chemistry of the tsumcorite-group minerals. New data on ferrilotharmeyerite, tsumcorite, thometzekite, mounanaite, helmutwinklerite, and a redefinition of gartrellite. *European Journal of Mineralogy* **10**, 179-206.