

**Crystal Data:** Isometric. *Point Group:*  $\bar{4}3m$ . As irregular masses intergrown with associated minerals, to 3 mm.

**Physical Properties:** *Cleavage:* One direction distinct in polished sections. *Tenacity:* Brittle. *Fracture:* Irregular to subconchoidal, rarely splintery. Hardness = 3-3.5 VHN = 188 (50 g load). *D(meas.)* = n.d. *D(calc.)* = 5.778

**Optical Properties:** Opaque. *Color:* Iron-black with a violet tint; pale rose to pale violet in plane-polarized reflected light. *Streak:* Black. *Luster:* Metallic.

*Optical Class:* Isotropic.

$R_{\text{air}}-R_{\text{oil}}$ : (470) 28.9-13.5, (589) 25.8-1.1, (650) 25.3-10.9

**Cell Data:** Space Group:  $F\bar{4}3m$ .  $a = 10.1250(12)$   $Z = 4$

**X-ray Powder Pattern:** Rosario shaft, Capillitas mining district, Catamarca Province, Argentina. 2.943 (100), 1.805 (70), 3.074 (60), 1.962 (50), 5.896 (30), 2.083 (30), 1.725 (25), 2.343 (20)

| Chemistry: | (1)    | (2)    |
|------------|--------|--------|
| Cu         | 32.71  | 32.48  |
| Ag         | 39.83  | 38.71  |
| Ge         | 7.62   | 7.89   |
| S          | 20.59  | 20.92  |
| Total      | 100.75 | 100.00 |

(1) Rosario shaft, Capillitas mining district, Catamarca Province, Argentina; average of 29 electron microprobe analyses, corresponds to  $(\text{Cu}_{4.73}\text{Ag}_{3.40})_{\Sigma=8.13}\text{Ge}_{0.97}\text{S}_{5.91}$ . (2)  $(\text{Cu}_{4.7}\text{Ag}_{3.3})_{\Sigma=8}\text{GeS}_6$ .

**Occurrence:** Fills cavities and vugs in bornite-chalcocite ore associated with andesitic rocks which host porphyry Cu-Au and epithermal vein-type mineral deposits.

**Association:** Catamarcaite, hübnerite, Ge-stannoidite, luzonite, sphalerite, tennantite, thalcosite, wittichenite, chalcocite, bornite.

**Distribution:** From dumps near the Rosario shaft, Capillitas mining district, Department of Andalgalá, Catamarca Province, Argentina.

**Name:** Honors Hubert Putz (b. 1973), who discovered the first specimens and who has made a significant contribution to the mineralogy of Ge in the Capillitas deposit.

**Type Material:** Division of Mineralogy, University of Salzburg, Austria (14835-14837); the Systematic References Series, National Mineral Collection of Canada, Geological Survey of Canada, Ottawa, Canada (NMCC 68096); and the Laboratory for Chemical and Mineralogical Crystallography, University of Bern, Switzerland.

**References:** (1) Paar, W.H., A.C. Roberts, P. Berlepsch, T. Armbruster, D. Topa, and G. Zagler (2004) Putzite,  $(\text{Cu}_{4.7}\text{Ag}_{3.3})_{\Sigma=8}\text{GeS}_6$ , a new mineral species from Capillitas, Catamarca, Argentina: Description and crystal structure. *Can. Mineral.*, 42(6), 1757-1769. (2) (2005) *Amer. Mineral.*, 90, 1231-1232 (abs. ref. 1).