

Crystal Data: Tetragonal. *Point Group:* 422. Tabular crystals, to 0.1 mm, flattened on {001}, showing {001}, {100}, {110}, in spherical aggregates and crusts.

Physical Properties: *Cleavage:* On {001}, perfect. *Fracture:* Irregular. *Tenacity:* Fragile [sic]. Hardness = Soft. D(meas.) = 4.1(1) D(calc.) = [4.08]

Optical Properties: Translucent. *Color:* Turquoise-blue. *Streak:* Pale blue.

Luster: Vitreous.

Optical Class: Uniaxial (-). *Pleochroism:* Strong; *O* = turquoise-blue; *E* = pale blue to light green. $\omega = 1.770(5)$ $\epsilon = 1.710(5)$

Cell Data: *Space Group:* $P4_122$ or $P4_322$. $a = 10.066(1)$ $c = 39.39(4)$ $Z = 8$

X-ray Powder Pattern: Cap Garonne mine, France.

9.83 (100), 3.132 (90), 4.925 (60), 4.482 (50b), 2.515 (50), 2.772 (40), 1.778 (40)

Chemistry:

	(1)	(2)
As ₂ O ₅	36.66	37.40
CuO	32.97	32.36
PbO	16.79	18.16
CaO	0.62	
Na ₂ O	2.92	2.52
Cl	3.54	2.88
H ₂ O	7.2	7.33
-O = Cl ₂	0.80	0.65
Total	99.90	100.00

(1) Cap Garonne mine, France; by electron microprobe, average of 16 analyses, H₂O by TGA; corresponding to Na_{1.15}Ca_{0.13}Pb_{0.92}Cu_{5.09}(AsO₄)_{3.90}Cl_{1.23}•4.91H₂O.

(2) NaPbCu₅(AsO₄)₄Cl•5H₂O.

Occurrence: A rare post-mining mineral formed in the oxidized zone of a red-bed sandstone Pb-Cu deposit (Cap Garonne mine, France).

Association: Olivenite, geminite, antlerite, anglesite, covellite, tennantite, galena (Cap Garonne mine, France); mimetite, beudantite-segnitite (Broken Hill, Australia).

Distribution: From the Cap Garonne mine, near le Pradet, Var, France. At Broken Hill, New South Wales, Australia.

Name: Honoring Dr. Zdenek Johan (1935–), mineralogist and Director of Scientific Affairs, Bureau de Recherches Géologiques et Minières, Orléans, France.

Type Material: Natural History Museum, Geneva, Switzerland; Natural History Museum, Paris, France.

References: (1) Chiappero, P.-J. and H. Sarp (1995) Zdenekite, NaPbCu₅(AsO₄)₄Cl•5H₂O, a new mineral from the Cap Garonne mine, Var, France. *Eur. J. Mineral.* 7, 553–557. (2) (1996) *Amer. Mineral.*, 81, 253 (abs. ref. 1).