

Crystal Data: Monoclinic. *Point Group:* 2/m. Acicular crystals, in cross-fiber veinlets and spherulites, to 1 mm.

Physical Properties: *Cleavage:* One, good. Hardness = 3.5 D(meas.) = 3.14(2) D(calc.) = 3.203

Optical Properties: Translucent. *Color:* Pale rose to colorless. *Luster:* Vitreous.

Optical Class: Biaxial (+). $\alpha = 1.660$ $\beta = 1.663$ $\gamma = 1.665$ $2V(\text{meas.}) = 90.6^\circ$

Orientation: $Z \wedge c = 37^\circ$. *Dispersion:* $r > v$, strong.

Cell Data: *Space Group:* $P2_1/c$. $a = 5.8279(2)$ $b = 10.1802(4)$ $c = 22.8944(10)$ $\beta = 96(943)^\circ$
Z = 4

X-ray Powder Pattern: Tuva, Russia.

4.09 (10), 2.78 (10), 3.01 (6), 1.853 (6), 3.27 (5), 2.56 (5), 2.11 (5)

Chemistry:	(1)	(2)	(3)
As ₂ O ₅	53.31	52.1	52.05
CaO	34.0	33.2	34.19
ZnO			0.01
<u>H₂O</u>	<u>12.1</u>	<u>12.1</u>	<u>12.41</u>
Total	99.4	97.4	98.66

(1) Tuva, Russia. (2) Irhtem mine, Morocco. (3) Ait Ahmane vein No. 53, Bou Azzer district, Morocco; average of 10 electron microprobe analyses, corresponds to $\text{Ca}_{4.03}(\text{AsO}_4)_2(\text{As}_{0.99}\text{O}_3\text{OH})\cdot 4\text{H}_2\text{O}$.

Occurrence: A rare secondary mineral in the oxidized zone of arsenic-bearing mineral deposits.

Association: Picroparmacolite, erythrite, aragonite (Tuva, Russia).

Distribution: From the Vladimirovskoye cobalt deposit, Altai Mountains, and the Khovu-Aksy Ni-Co deposit, Tuva, Siberia, Russia. In the Bauhaus district, Richelsdorf Mountains, Hesse, Germany. From the Irhtem (Ightem) mine, Bou Azzer district, Morocco. In the USA, at the Mohawk mine, Keweenaw Co., Michigan. From the Corbriza mine, Copiapó, Chile.

Name: For its first-noted occurrence in the *Vladimirovskoye* deposit, Russia.

Type Material: Mining Institute, St. Petersburg, Russia (1220/1); A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia (57263).

References: (1) Nefedov, Y.I. (1953) [Report on new minerals] in: V.A. Mokievsky, The scientific session of the Federov Institute together with the All-Union Mineralogical Society. Zap. Vses. Mineral. Obshch., 82, 311-317 (in Russian). (2) (1955) Amer. Mineral., 40, 551 (abs. ref. 1). (3) Pierrot, R. (1964) Contribution à la minéralogie des arsénates calciques et calcomagnésien naturels. Bull. Soc. fr. Minéral., 87, 169-211 (in French). (4) Yakhontova, L.K. and T.I. Stolyarova (1970) New data on vladimirite. Zap. Vses. Mineral. Obshch., 99, 362-364 (in Russian). (5) Pekov, I.V. (1998) Minerals first discovered on the territory of the former Soviet Union, 230. (6) Yang, H., S.H. Evans, R.T. Downs, and R.A. Jenkins (2011) The crystal structure of vladimirite, with a revised chemical formula, $\text{Ca}_4(\text{AsO}_4)_2(\text{AsO}_3\text{OH})\cdot 4\text{H}_2\text{O}$. Can. Mineral., 49, 1055-1064. (7) (2012) Amer. Mineral., 97, 2072 (abs. ref. 6)