Vladimirite $Ca_4(AsO_4)_2(AsO_3OH)\cdot 4H_2O$

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 (+). α = 1.660 β = 1.663 γ = 1.665 2V(meas.) = 90.6°
Orientation: $Z \wedge c = 37°$. *Dispersion:* $r > v$, strong.

Cell Data: *Space Group:* $P2_1/c$. a = 5.8279(2) b = 10.1802(4) c = 22.8944(10) β = 96(943)°
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_2O_5	53.31	52.1	52.05
CaO	34.0	33.2	34.19
ZnO			0.01
H_2O	12.1	12.1	12.41
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 $Ca_{4.03}(AsO_4)_2(As_{0.99}O_3OH)\cdot 4H_2O$.

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

Association: Picropharmacolite, 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 *Vladimir*ovskoye deposit, Russia.

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

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