

Anduoite**(Ru, Os)As₂**

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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$ or $mm2$. As euhedral to anhedral grains, to 100 μm , or in granular aggregates.

Physical Properties: *Cleavage:* At least one noted. *Tenacity:* Brittle. *Hardness* = n.d. VHN = 1077.9 (50 g load). *D(meas.)* = n.d. *D(calc.)* = 8.692

Optical Properties: Opaque. *Color:* Lead-gray; in polished section, white with a pink tint. *Streak:* Grayish black. *Luster:* Dull metallic. *Pleochroism:* Noticeable in air, from pinkish grayish white to pinkish white; distinct in oil. *Anisotropism:* Marked in air, from brownish yellow to grayish green, pale red to pale green; pronounced in oil, from reddish yellow, greenish yellow to purplish gray.

R₁-R₂: n.d.

Cell Data: *Space Group:* $Pn\bar{m}$ or $Pnn2$. $a = 5.41$ $b = 6.206$ $c = 3.01$ $Z = 2$

X-ray Powder Pattern: Anduo, Tibet, China.

1.920 (100), 1.501 (90), 1.095 (90), 1.133 (80), 1.210 (70), 1.187 (70), 2.000 (50)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
Ru	34.47	30.35	30.65	Cu	0.10	0.00	0.00
Os	6.20	7.27	8.37	Ni	0.00	0.00	0.95
Pt	0.00	0.82	0.65	As	56.65	56.57	56.91
Pd	0.00	0.52	0.61	Sb	0.01	0.00	0.00
Rh	0.00	1.02	1.54	S	0.09	0.26	0.12
Ir	2.08	1.86	0.54				
				Total	99.60	98.67	100.34

(1) Anduo, Tibet, China; by electron microprobe, average of six analyses, corresponding to $(\text{Ru}_{0.89}\text{Os}_{0.08}\text{Ir}_{0.03}\text{Cu}_{0.03})_{\Sigma=1.03}(\text{As}_{1.98}\text{S}_{0.01})_{\Sigma=1.99}$. (2) Kapinitov deposit, Ukraine; by electron microprobe, average of four analyses, corresponding to $(\text{Ru}_{0.80}\text{Os}_{0.10}\text{Ir}_{0.03}\text{Rh}_{0.03}\text{Pd}_{0.01}\text{Pt}_{0.01})_{\Sigma=0.98}(\text{As}_{2.01}\text{S}_{0.02})_{\Sigma=2.03}$. (3) Maja e Sukës deposit, Albania; by electron microprobe, corresponding to $(\text{Ru}_{0.79}\text{Os}_{0.11}\text{Rh}_{0.04}\text{Ni}_{0.04}\text{Pd}_{0.02}\text{Ir}_{0.01})_{\Sigma=1.01}(\text{As}_{1.98}\text{S}_{0.01})_{\Sigma=1.99}$.

Polymorphism & Series: Forms a series with omeiite.

Occurrence: Of magmatic origin, as very rare inclusions in chromian spinel in chromitite bodies enclosed variously by augite peridotite, serpentized dunite, harzburgite, and pyroxenite.

Association: Chromian spinel, pyrite, pyrrhotite, marcasite, magnetite, chalcopyrite, molybdenite, galena, millerite, violarite. Other platinum group minerals present are ruthenarsenite, sperrylite, ruthenian iridarsenite, irarsenite, irarsite, osarsite, osmiridium, ruthenian osmiridium, laurite, rutheniridosmine (Anduo, Tibet, China); chromian spinel, sperrylite, hollingworthite (Maja e Sukës deposit, Albania).

Distribution: From the Anduo chromite deposit, northern Tibet, China. At the Kapitanov chromite deposit, near Zvenyhorodka, Ukraine. From the Maja e Sukës chromite deposit, Tropoja massif, Albania.

Name: For the Chinese locality at Anduo.

Type Material: Chinese Geological Museum (City ?).

References: (1) Yu, T. and Chou, H. (1979) Anduoite, a new ruthenium arsenide. *Kexue Tongbao*, 15, 704–708 (in Chinese with English abs.). (2) (1980) *Amer. Mineral.*, 65, 808–809 (abs. ref. 1). (3) Gornostayev, S.S., M. Ohnenstetter, A. Neziraj, D. Ohnenstetter, K.V.O. Laajoki, S.E. Popovchenko, and P.K. Korninko (2001) New occurrences of anduoite, $(\text{Ru, Os})\text{As}_2$, from chromite deposits of Ukraine and Albania. *Can. Mineral.*, 39, 591–606. (4) Cabri, L.J., Ed. (1981) *Platinum group elements: mineralogy, geology, recovery*. *Can. Inst. Min. & Met.*, 95–96.

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