

**Crystal Data:** Tetragonal. *Point Group:*  $4/m\ 2/m\ 2/m$ . As equant to prismatic crystals, to 0.2 mm, showing {100}, {001}, {110}, {101}, and {111}; more commonly as irregular grains.

**Physical Properties:** *Tenacity:* Very brittle. Hardness = 5.5–6 VHN = 477–537, 606–681 (100 g load). D(meas.) = 7.82(6) D(calc.) = 8.09

**Optical Properties:** Opaque; transparent in extremely thin sections. *Color:* Black with a weak brownish tint; brownish yellow with a greenish tint in thin section; grayish white in reflected light, with yellow-brown to dark brownish green internal reflections. *Luster:* Vitreous.

*Optical Class:* Uniaxial, sensibly isotropic. *Anisotropism:* Very weak.

R: (470) 22.5, (490) 22.2, (510) 21.8, (530) 21.2, (546) 21.0, (570) 20.9, (589) 20.8, (610) 20.6, (630) 20.4, (650) 20.2

**Cell Data:** *Space Group:* [ $P4/nmm$ ] (by analogy to synthetic material).  $a = 3.89\text{--}3.91$   
 $c = 4.16\text{--}4.21$   $Z = [1]$

**X-ray Powder Pattern:** Crni Kamen, Macedonia.

2.843 (10), 1.603 (9), 2.728 (8), 2.284 (7), 1.954 (7), 3.836 (6), 1.370 (5)

**Chemistry:**

	(1)	(2)	(3)
TiO <sub>2</sub>	25.07	24.5	26.36
Bi <sub>2</sub> O <sub>3</sub>	2.20		
FeO	2.69	1.0	
PbO	70.55	74.5	73.64
Total	100.51	100.0	100.00

(1) Crni Kamen, Macedonia. (2) Långban, Sweden; by electron microprobe, average of 20 analyses; total Fe as FeO; corresponding to  $(\text{Pb}_{1.04}\text{Fe}_{0.04})_{\Sigma=1.08}\text{Ti}_{0.96}\text{O}_3$ . (3) PbTiO<sub>3</sub>.

**Occurrence:** As a rare accessory mineral in microcline-quartz syenite pegmatite veins cutting pyroxene amphibole schist (Crni Kamen, Macedonia); as inclusions in hematite and magnetoplumbite in a metamorphosed Fe–Mn orebody (Långban, Sweden).

**Association:** Microcline, quartz, aegirine, arfvedsonite, rutile, zircon (Crni Kamen, Macedonia); hematite, magnetoplumbite, manganian phlogopite, calcian mimetite, manganian kentrolite (Långban, Sweden); ganomalite, tephroite, lead, jacobsonite, calcite, phlogopite, hancockite, melanotekite, hematite (Jakobsberg, Sweden).

**Distribution:** From Crni Kamen, near Prilep, Macedonia. At Långban and Jakobsberg, Värmland, Sweden.

**Name:** For Macedonia, where the mineral was discovered.

**Type Material:** Institute for Nuclear Raw Materials, Belgrade, Serbia (Yugoslavia); National Museum of Natural History, Washington, D.C., USA, 122391.

**References:** (1) Radusinović, D. and C. Markov (1971) Macedonite - lead titanate: a new mineral. *Amer. Mineral.*, 56, 387–394. (2) Burke, E.A.J. and C. Kieft (1971) Second occurrence of macedonite [macedonite], PbTiO<sub>3</sub>, Langban, Sweden. *Lithos*, 4, 101–104.