

Crystal Data: Monoclinic. *Point Group:* 2/m. Massive, and as aggregates of columnar crystals.

Physical Properties: *Cleavage:* Pronounced columnar cleavage. Hardness = Very low. VHN = n.d. D(meas.) = 2.82(1) D(calc.) = 2.834

Optical Properties: Opaque. *Color:* Lead-gray on fresh surface, gray-black on old; dark gray in reflected light. *Luster:* Metallic. *Pleochroism:* Strong.

R₁–R₂: (400) 20.2–29.9, (420) 20.0–30.0, (440) 19.8–30.1, (460) 19.8–30.8, (480) 20.0–31.9, (500) 20.1–32.6, (520) 20.1–32.9, (540) 20.0–32.8, (560) 19.8–32.4, (580) 19.6–31.4, (600) 19.1–30.5, (620) 18.9–29.6, (640) 18.8–29.6, (660) 19.0–29.8, (680) 19.2–30.3, (700) 19.5–31.0

Cell Data: *Space Group:* I2/c. *a* = 6.775(5) *b* = 10.42(1) *c* = 12.11(1) β = 100.8(2.0)° Z = 8

X-ray Powder Pattern: Synthetic VS₄.

5.604 (100), 5.181 (65), 2.473 (30), 2.216 (30), 2.047 (25), 3.151 (20), 2.962 (20)

Chemistry: Composition established by comparison of X-ray patterns with synthetic material.

Occurrence: As interstitial filling in the core of a porous 2.5 m layer of admixed vanadium-bearing minerals. These vanadian materials are in fissures that cut red shales and that were probably filled by a remobilized asphaltite deposit.

Association: Sulfur, bravoite, pyrite, minasragrite, stanleyite, dwornikite, quartz, vanadian lignite, natural coke.

Distribution: A major ore mineral in what was the world's richest vanadium deposit, at Minasragra, 46 km from Cerro de Pasco, Peru [TL].

Name: After Antenor Rizo-Patrón (1866–1948), Peruvian metallurgist, discoverer of the Peruvian occurrence.

Type Material: n.d.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 347. (2) Tudo, J. (1965) Sur l'étude du sulfate de vanadyle et de sa réduction par l'hydrogène sulfuré: les sulfures de vanadium. Rev. Chim. Minérale, 2, 53–117 (in French). (3) Allmann, R., I. Baumann, A. Kutoglu, H. Rösch, and E. Hellner (1963) Die Kristallstruktur des Patronits V(S₂)₂. Naturwiss., 51, 263–264 (in German). (4) Kutoglu, A. and R. Allmann (1972) Strukturverfeinerung des Patronits, V(S₂)₂. Neues Jahrb. Mineral., Monatsh., 339–345 (in German with English abs.).