Veenite $Pb_2(Sb,As)_2S_5$

Crystal Data: Orthorhombic. *Point Group:* $mm2$ or $2/m\ 2/m\ 2/m$. Rarely as equant prisms elongated along [100] and flattened on {010}, grooved and roughened; typically massive, to 2 cm, and as anhedral grains. *Twinning:* Lamellar.

Physical Properties: *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = n.d. VHN = 146–167, 155 average (100 g load). D(meas.) = 5.92 D(calc.) = 5.96

Optical Properties: Opaque. *Color:* Steel-gray; white in reflected light. *Streak:* Black, faint brownish tinge against white background. *Pleochroism:* Weak; white to pale pinkish gray. *Anisotropism:* Moderate.

R_1–R_2: (400) 40.2–43.8, (420) 39.9–43.4, (440) 39.6–43.0, (460) 39.2–42.8, (480) 38.8–42.6, (500) 38.4–42.3, (520) 37.9–42.0, (540) 37.4–41.7, (560) 37.0–41.4, (580) 36.5–40.8, (600) 36.1–40.3, (620) 35.7–39.8, (640) 35.3–39.1, (660) 34.7–38.4, (680) 34.0–37.6, (700) 33.3–36.8

Cell Data: *Space Group:* $P2_1cn$ or $Pmcn$. $a = 8.44$ $b = 26.2$ $c = 7.90$ $Z = 8$

X-ray Powder Pattern: Madoc, Canada.
3.81 (100), 3.03 (90), 3.42 (80), 3.26 (80), 2.76 (70), 3.23 (50), 2.93 (50)

Chemistry:

	(1)
Pb	51.2
Cu	0.08
Ag	0.09
Sb	19.1
As	7.9
S	21.2
Total	99.47

(1) Madoc, Canada; by electron microprobe, corresponds to $(Pb_{1.90}Cu_{0.01}Ag_{0.01})_{\Sigma=1.92}(Sb_{1.21}As_{0.81})_{\Sigma=2.02}S_{5.06}$.

Occurrence: As small masses, stringers, and disseminated grains in marbles developed in a sequence of Precambrian metasediments near a contact with plutonic granitic gneiss (Madoc, Canada).

Association: Gratonite, calcite, boulangerite, other lead antimonides, sphalerite, pyrite, chalcopyrite, arsenopyrite, galena (Madoc, Canada).

Distribution: In Canada, in Ontario, from near Madoc [TL] and in the Mattabi mine, 60 km north of Ignace. At Huachocolpa, Huancavelica, Peru.

Name: To honor R.W. van der Veen (1883–1925), Dutch economic geologist and metallographer.

Type Material: Canadian Geological Survey, Ottawa, 12170; Canadian Museum of Nature, Ottawa; Royal Ontario Museum, Toronto, Canada.

References: (1) Jambor, J.L. (1967) New lead sulfantimonides from Madoc, Ontario, Part I. Can. Mineral., 9, 7–24. (2) (1968) Amer. Mineral., 53, 1422 (abs. ref. 1). (3) Jambor, J.L., J.H.G. Laflamme, and D.A. Walker (1982) A re-examination of the Madoc sulfosalts. Mineral. Record, 13, 93–100. (4) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 605.