

Vernadite**(Mn⁴⁺, Fe³⁺, Ca, Na)(O, OH)₂·nH₂O**

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Crystal Data: Hexagonal. *Point Group:* n.d. As poorly crystalline leaflets, characteristically curved and folded to resemble fibers, to some tens of Å; colloidal, dense microcrystalline.

Physical Properties: Hardness = Soft. VHN = 20–45 D(meas.) = 2.9–3.0 D(calc.) = n.d.

Optical Properties: Opaque. *Color:* Black.

Optical Class: Uniaxial.

R₁–R₂: n.d.

Cell Data: *Space Group:* n.d. *a* = 2.84–2.86 *c* = ~4.7 *Z* = n.d.

X-ray Powder Pattern: Locality not stated; may be confused with feroxyhyte. ~2.45 (b), ~1.42 (b)

Chemistry:	(1)	(2)		(1)	(2)
SiO ₂	0.80	1.30	CaO	2.15	5.17
TiO ₂	1.50		SrO		0.33
MnO ₂	46.47	56.45	BaO		1.93
Al ₂ O ₃	1.00	1.00	Na ₂ O	2.29	0.12
Fe ₂ O ₃	10.47	7.00	K ₂ O	0.60	0.23
MnO	1.09	4.81	Cl	1.19	
CoO	3.41		H ₂ O ⁺	6.94	3.00
NiO	0.95		H ₂ O ⁻	18.50	13.53
PbO	0.34		CO ₂		3.70
MgO	2.62	0.28	P ₂ O ₅		1.30
			Total	100.32	100.15

(1) Kurchatov fracture zone, Pacific Ocean; corresponds to MnO₂·(R₂O)_{0.04}·(RO)_{0.32}·(R₂O₃)_{0.14}·2.64H₂O. (2) Lovozero massif, Russia; corresponds to MnO₂·(R₂O)_{0.01}·(RO)_{0.26}·(R₂O₃)_{0.08}·1.42H₂O.

Occurrence: A weathering product of other manganese oxides, carbonates, and silicates; easily formed by the action of Fe, Mn-oxidizing bacteria.

Association: Todorokite, pyrolusite, romanèchite, cryptomelane, manganite, ferrihydrite.

Distribution: Undoubtedly much more common than the few well-authenticated localities indicate. In Russia, from the Kusimovskoye manganese deposit, 25 km west-northwest of Magnitogorsk, Southern Ural Mountains; on Mt. Zarod, Sikhote-Alin Mountains, Primorskiy Territory; and on Lepkhe-Nelm, Lovozero massif, Kola Peninsula. On Groote Eylandt, Northern Territory, Australia. An important component of ocean-floor manganese nodules.

Name: For Professor Vladimir Ivanovich Vernadsky (1863–1945), Russian naturalist and geochemist, Moscow University, Moscow, Russia.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 43441, 43442.

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