Dellagiustaite $V^{2+}Al_2O_4$

Crystal Data: Cubic. *Point Group*: 4/*m* $\bar{3}$ 2/*m*. As idiomorphic crystals showing {111} to 200 μm, commonly with tubular inclusions of non-stoichiometric vanadium oxide; as inclusions in hibonite and grossite.

Physical Properties: *Cleavage*: None. *Parting*: Irregular and conchoidal. *Tenacity*: Brittle. *Fracture*: Uneven and splintery. Hardness = 6.5-7 D(meas.) = n.d. D(calc.) = 4.6 Nonfluorescent.

Optical Properties: Opaque. *Color*: Black, light gray in reflected light. *Streak*: Black. *Luster*: Metallic.
Optical Class: Isotropic.
R: (471.1) 14.1, (548.3) 13.8, (586.6) 13.6, (652.3) 13.7

Cell Data: *Space Group*: *Fd*$\bar{3}$ *m*. *a* = 8.1950(1) Z = 8

X-Ray Diffraction Pattern: Sierra de Comechingones, San Luis, Argentina.
1.447 (100), 1.023 (87), 2.047 (58), 1.576 (38), 0.836 (35), 1.182 (27), 0.915 (21)

Chemistry:

	(1)	(2)	(3)
MnO	0.20	0.33	
CaO		0.66	
MgO	1.82	8.61	
VO	[32.38]	21.42	39.75
V_2O_3	34.83	31.27	
Al_2O_3	29.55	34.45	60.25
Cr_2O_3		0.66	
Ti_2O_3	1.66		
Total	100.44	97.40	100.00

(1) Sierra de Comechingones, San Luis, Argentina; average electron microprobe analysis, VO calculated from stoichiometry; corresponds to $(Al_{1.09}V^{2+}_{0.91}V^{3+}_{0.87}Mg_{0.08}Ti^{3+}_{0.04}Mn_{0.01})_{\Sigma=3}O_4$, may have limited replacement of V^{2+} by Mg and of V^{3+} by Al. (2) Mt. Carmel, Israel; average electron microprobe analysis; corresponds to $(Al_{1.23}V^{2+}_{0.58}V^{3+}_{0.76}Mg_{0.39}Ca_{0.02}Cr^{3+}_{0.02}Mn_{0.01})_{\Sigma=3.01}O_4$.
(3) $V^{2+}Al_2O_4$.

Mineral Group: Spinel supergroup, oxyspinel group and the spinel subgroup.

Occurance: In super-reduced mineral assemblages crystallized from high-temperature melts trapped in corundum aggregates (micro-xenoliths) within picritic-tholeiitic lavas (Mt Carmel).

Association: Hibonite (containing tubular inclusions to 100 μm of metallic vanadium), grossite, gehlenite, aluminum-rich perovskite (Argentina); V-rich hibonite, grossite, krotite, $Ca_2Al_3O_6F$, fluorite, tubular inclusions of metallic V and V alloys (Mt. Carmel).

Distribution: From Sierra de Comechingones, San Luis, Argentina [TL]. At Mt. Carmel, northern Israel.

Name: Honors Professor Antonio *Della Giusta* (b. 1941), University of Padova, Italy, an expert on the crystal chemistry and cation order-disorder phenomena in spinel group minerals.

Type Material: University of Milan, Italy (MCMGPG-H2017-001), and in the mineral collection of A. and R. Pagano (12794C).

References: (1) Cámara, F., L. Bindi, A. Pagano, R. Pagano, S.E.M. Gain, and W.L. Griffin (2019) Dellagiustaite: A novel natural spinel containing V^{2+}. Minerals, 9, 4, 1-16.