

Crystal Data: Monoclinic. *Point Group:* 2/m. Granular and as lamellae (to 0.5 mm wide) intergrown with triphylite or products of its topotactic oxidation.

Physical Properties: *Cleavage:* Good on {010}. *Fracture:* Irregular.
Tenacity: Brittle. *Hardness* = ~5 *D*(meas.) = n.d. *D*(calc.) = 3.793

Optical Properties: Transparent. *Color:* Pinkish brown, colorless in transmitted light.
Streak: Colorless. *Luster:* Vitreous.
Optical Class: Biaxial (+). $\alpha = 1.710(2)$ $\beta = 1.713(2)$ $\gamma = 1.725(5)$ $2V(\text{meas.}) = 54.2(2)^\circ$
 $2V(\text{calc.}) = 53.4^\circ$ *Orientation:* $X \parallel b$, $Y \wedge a = 44.2^\circ$ in β obtuse, $Z \wedge a = 35.0^\circ$ in β acute.
Dispersion: $r < v$, weak. *Pleochroism:* None.

Cell Data: Space Group: $P2_1/c$. $a = 8.811(2)$ $b = 11.494(2)$ $c = 6.138(1)$ $\beta = 99.23(3)^\circ$ $Z = 4$

X-ray Powder Pattern: Calculated pattern.
2.874 (100), 2.858 (79), 3.506 (73), 2.717 (56), 2.953 (55), 2.916 (53), 2.899 (44)

Chemistry:	(1)	(2)
P ₂ O ₅	40.02	39.81
FeO	27.31	40.03
MnO	26.06	19.89
MgO	0.66	
CaO	4.74	
ZnO	0.29	
Total	99.09	100.00

(1) Near Lutomia village, Lower Silesia, southwest Poland; average of 20 electron microprobe analyses supplemented by Raman and Mössbauer spectroscopy; corresponds to $(\text{Fe}_{1.34}\text{Mn}_{1.30}\text{Ca}_{0.30}\text{Mg}_{0.05}\text{Zn}_{0.01})_{\Sigma=3.00}(\text{PO}_4)_{1.99}$. (2) MnFe₂(PO₄)₂.

Polymorphism & Series: Forms series with beusite and graftonite members of the group.

Mineral Group: Graftonite group.

Occurrence: A common primary phosphate in beryl-columbite-phosphate subtype of zoned rare-element pegmatites related to anatexitic melts, generated by partial melting of metasedimentary-metavolcanics rocks during amphibolite-facies metamorphism and migmatization.

Association: Sarcopside, graftonite-(Ca), triphylite oxidized topotactically to ferrisicklerite and heterosite, alluaudite-group minerals, wolfeite, staněkite, whitlockite.

Distribution: From two quarries near Lutomia village, ~5 km southeast of Świdnica and ~60 km southwest of Wrocław, Lower Silesia, southwest Poland.

Name: The suffix indicates the ^{M1}Mn-analogue of *graffonite*, ^{M(1)}Fe^{M(2),M(3)}Fe₂(PO₄)₂.

Type Material: Mineralogical Museum, University of Wrocław, Faculty of Earth Science and Environmental Management, Institute of Geological Sciences, Wrocław, Poland (MMWr IV7927 and IV7928).

References: (1) Pieczka, A., F.C. Hawthorne, N. Ball, Y. Abdu, B. Gołębiowska, A. Włodek, and J. Żukrowski (2018) Graftonite-(Mn), ideally ^{M1}Mn^{M2,M3}Fe₂(PO₄)₂, and graftonite-(Ca), ideally ^{M1}Ca^{M2,M3}Fe₂(PO₄)₂, two new minerals of the graftonite group from Poland. *Mineral. Mag.*, 82(6), 1307-1322. (2) (2020) *Amer. Mineral.*, 105(7), 972-973 (abs. ref. 1). (3) Hawthorne, F.C. and A. Pieczka (2018) Classification of the minerals of the graftonite group. *Mineral. Mag.*, 82(6), 1301-1306.