

Crystal Data: Tetragonal. *Point Group:* $\bar{4} 2m$. As grains to 0.07 mm included in diamond.

Physical Properties: *Cleavage:* None. *Tenacity:* Brittle. *Fracture:* Irregular. Hardness = ~ 7
VHN = 1346 D(meas.) = n.d. D(calc.) = 3.576

Optical Properties: Transparent. *Color:* Deep emerald-green. *Streak:* White. *Luster:* Vitreous.
Optical Class: Uniaxial (-). $\omega = 1.733(5)$ $\varepsilon = 1.721(5)$ *Pleochorism:* E = light blue,
O = colorless.

Cell Data: Space Group: $I\bar{4} 2d$. $a = 6.5231(1)$ $c = 18.1756(3)$ $Z = 4$

X-ray Powder Pattern: São Luiz River, Juina district, Mato Grosso, Brazil.

2.647 (100), 1.625 (44), 2.881 (24), 2.220 (19), 1.390 (13), 3.069 (11), 2.056 (11)

Chemistry:	(1)	(2)
SiO ₂	41.74	44.71
TiO ₂	0.06	
Al ₂ O ₃	23.84	25.29
Cr ₂ O ₃	2.86	
FeO _{total}	4.59	
FeO	3.65	
Fe ₂ O ₃	[0.93]	
MnO	0.79	
MgO	25.16	29.99
CaO	0.09	
Na ₂ O	0.10	
Total	99.23	100.00

(1) São Luiz River, Juina district, Mato Grosso, Brazil; electron microprobe analysis supplemented by micro-Raman spectroscopy, Fe₂O₃ calculated for charge balance; corresponds to

(Mg_{0.82}Fe³⁺_{0.12})_{Σ=0.95}(Al_{1.86}Cr_{0.16})_{Σ=2.02}(Mg_{1.80}Fe²⁺_{0.15}Mn_{0.05}Ca_{0.01}Na_{0.01})_{Σ=2.02}(Si_{2.82}Al_{0.18})_{Σ=3.00}O₁₂.

(2) Mg₃Al₂Si₃O₁₂.

Occurrence: Part of a composite inclusion with omphacitic pyroxene in an alluvial diamond; likely trapped in diamond in the deep upper mantle.

Association: Ferropericlasite, omphacitic pyroxene, CaSiO₃-walstromite, olivine, diamond.

Distribution: From the São Luiz River, Juina district, Mato Grosso, Brazil. Reported from the Kankan alluvial deposits, Guinea.

Name: Previously known as tetragonal-almandine-pyropo-phase (TAPP).

Honors two scientists, Jeffrey W. Harris (b. 1940), School of Geographical and Earth Sciences, University of Glasgow, Scotland, and Ben Harte (b. 1941), School of Geosciences, University of Edinburgh, Scotland, whose work on diamonds (super-deep diamonds in particular) has shaped the understanding of mantle geochemical processes.

Type Material: Museum of Mineralogy, University of Padova, Italy (M12660).

References: (1) Nestola, F., A.D. Burnham, L. Peruzzo, L. Tauro, M. Alvaro, M.J. Walter, M. Gunter, C. Anzolini, and S.C. Kohn (2016) Tetragonal almandine-pyropo phase, TAPP: finally, a name for it, the new mineral jeffbenite. *Mineral. Mag.*, 80(7), 1219-1232. (2) (2017) *Amer. Mineral.*, 102, 919 (abs. ref. 1).