Shulamitite $Ca_3TiFe^{3+}AlO_8$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m.* As grains or prismatic platelets to 200 μm, also as star-like twinned aggregates. *Twinning*: Simple (90°) and complex (90°, 45° and 60°) twinning is common.

Physical Properties: *Cleavage*: Good on {010}, imperfect on {001} and {100}. *Fracture*: Even to uneven. *Tenacity*: Brittle. Hardness = 6-7 VHN = 683-977 (100 g load).
D(meas.) = n.d. D(calc.) = 3.84-3865

Optical Properties: Transparent. *Color*: Reddish brown, reddish brown to yellow brown in transmitted light, gray with yellow-brown internal reflections in reflected light.
Streak: Light brown. *Luster*: Adamantine to submetallic. *Pleochroism*: Distinct, light gray to gray.
Optical Class: n.d.
R_1-R_2: (470) 11.7-12.6, (546) 11.6-12.4, (589) 11.6-12.3, 11.4-12.3 (650)

Cell Data: *Space Group*: *Pmma*. *a* = 5.4200(6) *b* = 11.064(1) *c* = 5.5383(7) Z = 2

X-ray Powder Pattern: Hatrurim Formation, Hatrurim basin, Israel.
2.677 (100), 2.755 (40), 1.940 (40), 11.12 (19), 1.585 (17), 1.842 (16), 1.559 (16)

Chemistry:

	(1)
SiO_2	0.80
TiO_2	20.39
ZrO_2	0.49
Cr_2O_3	0.30
Al_2O_3	8.82
Fe_2O_3	25.03
FeO	0.11
MgO	0.22
CaO	43.75
Total	99.02

(1) Hatrurim Formation, Hatrurim basin, Israel; average of 20 electron microprobe analyses, Fe^{3+}/Fe^{2+} by charge balance; corresponding to $(Ca_{2.992}Sr_{0.007}LREE_{0.007})(Ti_{0.981}Zr_{0.014}Nb_{0.001})(Fe^{3+}_{0.947}Mg_{0.022}Cr_{0.012}Fe^{2+}_{0.012}Mn_{0.001})(Al_{0.658}Fe^{3+}_{0.288}Si_{0.054})O_8$.

Occurrence: A major accessory phase in larnite-mayenite metacarbonate rocks formed by combustion metamorphism at very high temperature (1150-1170° C) and low pressure (spurrite-merwinite facies).

Association: Larnite, F-rich mayenite, chromian spinel, ye'elimite, fluorapatite, magnesioferrite.

Distribution: From the Hatrurim Formation, Hatrurim basin, Israel.

Name: Honors Dr. Shulamit Gross (1923-2012), emeritus member of the Geological Survey of Israel. The name is also related to biblical Shulamit, red-haired sweetheart of King Solomon.

Type Material: Mineralogical Museum, St.Petersburg State University (1/19465) and in the Central Siberian Geological Museum, V.S. Sobolev Institute of Geology and Mineralogy, Novosibirsk (VII-87/1), Russia.

References: (1) Sharygin, V.V., B. Lazic, T.M. Armbruster, M.N. Murashko, R.Wirth, I.O. Galuskina, E.V. Galuskin, Y. Vapnik, S.N. Britvin, and A.M. Logvinova (2013) Shulamitite $Ca_3TiFe^{3+}AlO_8$ - a new perovskite-related mineral from Hatrurim Basin, Israel. Eur. J. Mineral., 25(1), 97-111. (2) (2015) Amer. Mineral., 100, 1653-1654 (abs. ref. 1).