

Crystal Data: Triclinic. *Point Group:* $\bar{1}$. As irregular grains to 400 μm .

Physical Properties: *Cleavage:* None. *Fracture:* Irregular. *Tenacity:* n.d. *Hardness* = 6 VHN = 943(50 g load). *D(meas.)* = n.d. *D(calc.)* = 4.097

Optical Properties: Translucent. *Color:* Black to dark brown on thin edges; gray in reflected light with weak brown internal reflections. *Streak:* n.d. *Luster:* Semi-metallic.

Optical Class: n.d. *Pleochroism:* Very weak. Birefringence and anisotropy weak.

R_1 - R_2 : (470) 12.73-14.05, (546) 12.08-13.17, (589) 11.76-12.78, (650) 11.55- 12.48,

(700) 11.42-12.32

Cell Data: *Space Group:* $P\bar{1}$. $a = 10.5363(1)$ $b = 10.9242(2)$ $c = 9.0612(1)$ $\alpha = 106.340(1)^\circ$
 $\beta = 95.765(1)^\circ$ $\gamma = 124.373(1)^\circ$ $Z = 1$

X-ray Powder Pattern: Gurim anticline, near Arad city, Negev Desert, Israel.

2.5837 (100), 2.5859 (94), 2.7279 (75), 2.7278 (75), 2.9941 (71), 2.5901 (69), 2.9945 (67)

Chemistry:	(1)
TiO ₂	1.39
SiO ₂	8.29
Fe ₂ O ₃	[63.44]
Cr ₂ O ₃	0.52
Al ₂ O ₃	6.61
CaO	14.21
NiO	0.84
FeO	0.36
MnO	0.57
<u>MgO</u>	<u>3.41</u>
Total	99.64

(1) Gurim anticline, near Arad city, Negev Desert, Israel; average of 11 electron microprobe analyses supplemented by Raman spectroscopy, Fe₂O₃:FeO calculated from stoichiometry; corresponds to $\text{Ca}_4(\text{Fe}^{3+}_{8.528}\text{Mg}_{1.635}\text{Ca}_{0.898}\text{Ti}^{4+}_{0.336}\text{Ni}^{2+}_{0.217}\text{Mn}^{2+}_{0.155}\text{Cr}^{3+}_{0.132}\text{Fe}^{2+}_{0.098})_{\Sigma=12}\text{O}_4[(\text{Fe}^{3+}_{6.827}\text{Al}_{2.506}\text{Si}_{2.667})_{\Sigma=12}\text{O}_{36}]$.

Mineral Group: Rhönite group, sapphirine supergroup.

Occurrence: Formed from melt and as reaction rims in thin veins of paralava within fine-grained gehlenite rocks (pyrometamorphic hornfels).

Association: Gehlenite, rankinite, schorlomite, pseudowollastonite, Ni-bearing magnesioferrite, Ni-bearing magnesioferrite, andradite, barioferrite, Si- and Fe³⁺-bearing perovskite.

Distribution: From the Gurim anticline, near Arad city, Negev Desert, Israel.

Name: Honors Azerbaijanian and Israeli geophysicist Boris Emmanuilovich Khesin (1932-2010), after 1991, at the Ben-Gurion University of the Negev, Beer-Sheva, Israel.

Type Material: Museum of Natural History, Bern, Switzerland (NMBE 4717).

References: (1) Galuskina, I.O., E.V. Galuskin, A.S. Pakhomova, R. Widmer, T. Armbruster, B. Krüger, E.S. Grew, Y. Vapnik, P. Dzierżanowski, and M. Murashko (2017) Khesinite, $\text{Ca}_4\text{Mg}_2\text{Fe}^{3+}_{10}\text{O}_4[(\text{Fe}^{3+}_{10}\text{Si}_2)\text{O}_{36}]$, a new rhönite-group (sapphirine supergroup) mineral from the Negev Desert, Israel - natural analogue of the SFCA phase. *Eur. J. Mineral.*, 29(1), 101-116.
(2) (2017) *Amer. Mineral.*, 102, 1964 (abs. ref. 1).