Cuprokalininite $CuCr_2S_4$

Crystal Data: Cubic. *Point Group*: 4/*m* $\bar{3}$ 2/*m*. As octahedral or cuboctahedral crystals, to 0.20 mm, some with a pseudododecahedral faces {110}. *Twinning*: Polysynthetic and simple twinning on {111} (Spinel law) common.

Physical Properties: *Cleavage*: None. *Fracture*: Uneven. *Tenacity*: Very brittle. Hardness = 4.5-5 VHN = 396 (20-30 g load). D(meas.) = n.d. D(calc.) = 4.16
Slightly electromagnetic.

Optical Properties: Opaque. *Color*: Black with dark-bronze tint, pale cream in reflected light. *Streak*: Black. *Luster*: Submetallic.
Optical Class: Isotropic.
R: (400) 34.30, (420) 34.10, (440) 33.90, (460) 33.70, (480) 33.5, (500) 33.2, (520) 33.00, (540) 32.80, (560) 32.30, (580) 32.20, (600) 31.90, (620) 31.60, (640) 31.20, (660) 30.90, (680) 30.60, (700) 30.40

Cell Data: *Space Group*: *Fd*3*m*. *a* = 9.814(2) Z = 8

X-ray Powder Pattern: Mt. Rasvumchorr, Khibiny massif, Kola Peninsula, Russia.
2.94 (100), 1.73 (100), 1.00 (100), 1.88 (90), 3.44 (60), 2.44 (60), 1.13 (60)

Chemistry:

	(1)
Cu	21.03
Fe	0.47
Zn	0.17
Cr	29.01
V	5.85
As	0.21
Sb	0.08
S	43.25
Total	100.07

(1) Mt. Rasvumchorr, Khibiny massif, Kola Peninsula, Russia; average of 202 electron microprobe analyses; corresponding to $(Cu_{0.98}Fe_{0.02}Zn_{0.01})_{\Sigma=1.01}(Cr_{1.65}V_{0.34}As_{0.01})_{\Sigma=2.00}S_{3.99}$.

Mineral Group: Thiospinel group.

Occurrence: As disseminated inclusions in quartz from Cr-V-bearing quartz-diopside granulite facies metamorphic rocks.

Association: Cr-V-tremolite and mica, calcite, Cr-V spinels, V-titanite, pyrite, plagioclase, a mineral of the natalyite-kosmochlor series, goldmanite-uvarovite, dravite-chromdravite, karelianite-eskolaite.

Distribution: In the Sludyanka complex, South Baikal region, Russia.

Name: For its essential copper content and structural identity with *kalininite*, $ZnCr_2S_4$.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia (3886/1-3).

References: (1) Reznitsky, L.Z., E.V. Sklyarov, Z.F. Ushchapovskaya, L.F. Suvorova, Yu.S. Polekhovsky, P. Dzerzanovsky, and I.G. Barash (2010) Cuprokalininite, $CuCr_2S_4$ - a new sulfospinel from metamorphic rocks of Sludyanka complex, South Baikal region. Zap. Ross. Mineral. Obshch., 139(6), 39-49 (in Russian with English abstract). Geol. Ore Deposits, 53(8), 758-766 (in English). (2) (2012) Amer. Mineral., 97, 1527-1528 (abs. ref. 1).