

**Crystal Data:** Cubic. *Point Group:*  $4/m\bar{3}2/m$ . Irregular slablike aggregates, to 0.5 mm.

**Physical Properties:** Hardness = n.d. VHN = 468 (50 g load). D(meas.) = n.d.  
D(calc.) = 4.045 Strongly magnetic.

**Optical Properties:** Opaque. *Color:* Black, may be tarnished to colors; in reflected light, light creamy. *Luster:* Adamantine.

R: (400) —, (420) —, (440) 34.4, (460) 35.2, (480) 35.3, (500) 35.4, (520) 35.4, (540) 35.2, (560) 35.3, (580) 35.2, (600) 34.8, (620) 34.1, (640) 33.8, (660) 32.7, (680) 32.5, (700) —

**Cell Data:** *Space Group:*  $Fd\bar{3}m$ .  $a = 9.997$   $Z = 8$

**X-ray Powder Pattern:** Southern Baikal region, Russia.

1.757 (10), 1.019 (10), 2.98 (9), 1.910 (8), 2.47 (7), 3.48 (5), 1.153 (5)

**Chemistry:**

|       | (1)   | (2)    |
|-------|-------|--------|
| Zn    | 18.89 | 21.96  |
| Cu    | 2.73  |        |
| Cr    | 34.10 | 34.94  |
| V     | 0.61  |        |
| Sb    | 0.73  |        |
| S     | 42.22 | 43.10  |
| Total | 99.28 | 100.00 |

(1) Southern Baikal region, Russia; by electron microprobe, average of nine analyses on three grains; corresponding to Zn<sub>0.87</sub>Cu<sub>0.13</sub>Cr<sub>1.98</sub>V<sub>0.04</sub>Sb<sub>0.02</sub>S<sub>3.97</sub>. (2) ZnCr<sub>2</sub>S<sub>4</sub>.

**Mineral Group:** Linnaeite group.

**Occurrence:** In a garnet-pyroxene mixture in diopside-quartz-calcite rocks.

**Association:** Karelite, eskolaite, diopside, quartz, calcite, barite, zircon, chromian-vanadian tremolite, goldmanite-uvarovite, pyrite.

**Distribution:** From the Pereval marble quarry, near Slyudyanka, Sayan Mountains, southern Baikal region, eastern Siberia, Russia [TL].

**Name:** For Pavel Vasil'evich Kalinin (1905–1981), Russian mineralogist and petrologist, Moscow Geological Exploration Institute, investigator of the southern Baikal region.

**Type Material:** Mining Institute, St. Petersburg, 1098/1; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 88049.

**References:** (1) Reznickii, L.Z., E.V. Skl'arov, and Z.F. Ustschapovskaya (1985) Kalininite, ZnCr<sub>2</sub>S<sub>4</sub> – a new natural sulphospinel. Zap. Vses. Mineral. Obshch., 114, 622–627 (in Russian). (2) (1987) Amer. Mineral., 72, 223 (abs. ref. 1). (3) Wittlinger, J., S. Werner, and H. Schulz (1997) On the amorphisation of ZnCr<sub>2</sub>S<sub>4</sub> spinel under high pressure: x-ray diffraction studies. Phys. Chem. Minerals, 24, 597–600. (4) Pekov, I.V. (1998) Minerals first discovered on the territory of the former Soviet Union. Ocean Pictures, Moscow,