Calciborite CaB_2O_4

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Prismatic crystals, to 1.5 cm, in radial clusters and bundles, intimately intergrown with sibirskite.

Physical Properties: *Fracture:* Uneven to conchoidal. Hardness = ∼3.5 D(meas.) = 2.878 D(calc.) = 2.88 Bright green cathodoluminescence.

Optical Properties: Transparent to translucent. *Color:* Colorless to white. *Optical Class:* Biaxial (–). *Orientation:* Extinction angle 22°. $\alpha = 1.595$ $\beta = 1.654$ $\gamma = 1.670$ 2V(meas.) = 54°

Cell Data: *Space Group: Pccn.* $a = 8.38$ $b = 13.81$ $c = 5.00$ Z = 8

X-ray Powder Pattern: Novofrolovskoye deposit, Russia.
3.44 (10), 3.57 (8), 1.976 (7), 1.870 (7), 1.793 (7), 7.10 (6), 3.81 (6)

Chemistry:

	(1)	(2)
As_2O_5	0.30	
SiO_2	0.55	
CO_2	6.07	
B_2O_3	47.58	55.39
Fe_2O_3	0.22	
Al_2O_3	0.18	
MgO	0.81	
CaO	44.08	44.61
H_2O^+	0.17	
H_2O^-	0.50	
Total	100.46	100.00

(1) Novofrolovskoye deposit, Russia; contaminated by calcite, dolomite, and garnet. (2) CaB_2O_4.

Occurrence: From drillcore into a contact metasomatized limestone near a quartz diorite intrusion associated with a copper deposit in skarn.

Association: Sibirskite, calcite, dolomite, garnet, magnetite, pyroxene.

Distribution: From the Novofrolovskoye copper deposit, near Krasnoturinsk, Turinsk district, Northern Ural Mountains, Russia.

Name: For the essential chemical components, CALCIum and BORon.

Type Material: St. Petersburg Mining Institute, St. Petersburg, 1297/1; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 64943.

References: (1) Petrova, E.S. (1955) Calciborite, a new mineral. Geology of Mining and Chemical Raw Materials, 218–223 (in Russian). (2) (1956) Amer. Mineral., 41, 815 (abs. ref. 1). (3) Malinko, S.V., N.N. Kuznetsova, V.M. Pensionerova, and L.I. Rybakova (1963) New data on calciborite. Zap. Vses. Mineral. Obshch., 92, 684–690 (in Russian). (4) Shashkin, D.P., M.A. Simonov, and N.V. Belov (1971) X-ray diffraction study of natural calcium metaborates. Kristallografiya (Sov. Phys. Crystal.), 16, 231–235 (in Russian). (5) Yegorov-Tismenko, Y.K., M.A. Simonov, and N.V. Belov (1980) Crystal structures of calciborite $Ca_2[BO_3BO]_2$ and synthetic calcium boraluminate $2CaAl[BO_3]O \equiv Ca_2[AlO_3BO]_2$. Doklady Acad. Nauk SSSR, 251, 1122–1123 (in Russian). (6) Pekov, I.V. (1998) Minerals first discovered on the territory of the former Soviet Union. Ocean Pictures, Moscow, 49.