Kirchhoffite $CsBSi_2O_6$

Crystal Data: Tetragonal. *Point Group*: 4/*m* 2/*m* 2/*m*. As equant grains to 80 μm.

Physical Properties: *Cleavage*: None. *Fracture*: Conchoidal. *Tenacity*: Brittle. Hardness = 6-6.5 D(meas.) = 3.62(2) D(calc.) = 3.639

Optical Properties: Transparent. *Color*: Colorless. *Streak*: White. *Luster*: Vitreous. *Optical Class:* Uniaxial (+). ω = 1.592(2) ε = 1.600(2)

Cell Data: *Space Group*: $I4_1/acd$. a = 13.019(2) c = 12.900(3) Z = 16

X-ray Powder Pattern: Darai-Pioz alkaline massif, Tajikistan.
3.26 (100), 3.48 (82), 2.770 (67), 2.294 (41), 2.109 (34), 5.32 (32), 1.768 (22)

Chemistry:

	(1)
SiO_2	40.47
B_2O_3	11.27
K_2O	0.11
Cs_2O	48.16
Rb_2O	0.09
Total	100.10

(1) Darai-Pioz alkaline massif, Tajikistan; average of 50 electron microprobe analyses, B_2O_3 and Rb_2O by SIMS, corresponding to $(Cs_{1.02}K_{0.01})_{\Sigma=1.03}B_{0.96}Si_{2.02}O_6$.

Mineral Group: Analcime group.

Occurrence: In a massif composed of a variety of granitic, alkaline granitic and syenitic pegmatites, various hydrothermal rocks (albitites, fenites) and carbonatites.

Association: Quartz, pectolite, and subordinate fluorite, sokolovaite, baratovite, aegirine, polylithionite, stillwellite-(Ce), neptunite, pekovite, senkevichite, mendeleevite-(Ce).

Distribution: In glacial moraine, upper reaches of the Darai-Pioz River, near the junction of the Turkestan, Zeravshan, and Alai ridges, Darai-Pioz alkaline massif, Garm District, Tajikistan.

Name: Honors Professor Gustav Robert Kirchhoff (1824-1887), the German physicist at the universities of Breslau and Berlin, one of the founders of spectral analysis and co-discoverer (with Robert Bunsen) of cesium and rubidium.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia (3923/1).

References: (1) Agakhanov, A.A., L.A. Pautov, V.Yu. Karpenko, E. Sokolova, and F.C. Hawthorne (2012) Kirchhoffite, $CsBSi_2O_6$, a new mineral species from the Darai-Pioz alkaline massif, Tajikistan: description and crystal structure. Canadian Mineralogist, 50, 523-529. (2) (2014) Amer. Mineral., 99, 871 (abs. ref. 1).