Bazhenovite $CaS_5 \cdot CaS_2O_3 \cdot 6Ca(OH)_2 \cdot 20H_2O$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As bladed or platy crystals, to 5 mm, showing {110}, {011}, {101}, and {111}, flattened on {010}, elongated along [001]; in aggregates, to 1 cm.

Physical Properties: *Cleavage:* {010}, very good. *Fracture:* Uneven. *Tenacity:* Brittle but elastic. Hardness = 2 D(meas.) = 1.83(1) D(calc.) = 1.845 Soluble in H_2O, hydrolyzes in air, with sulfur evident in the residue.

Optical Properties: Transparent in thin crystals, translucent in aggregates. *Color:* Orange to yellow. *Streak:* Pale yellow. *Luster:* Vitreous, pearly on intergrowths of parallel plates. *Optical Class:* Biaxial (+). *Pleochroism:* Strong; X = deep yellow-green; Y = greenish yellow; Z = pale greenish yellow. *Orientation:* $X = b$; $Y = a$; $Z \wedge c = 30°$. *Absorption:* $X > Z > Y$. $\alpha = 1.595(2)$ $\beta = 1.619(2)$ $\gamma = 1.697(3)$ 2V(meas.) = n.d. 2V(calc.) = 60°20′.

Cell Data: *Space Group:* $P2_1/c$. $a = 8.45(1)$ $b = 17.47(1)$ $c = 8.24(1)$ $\beta = 119.5°$ Z = 1

X-ray Powder Pattern: Chelyabinsk coal basin, Russia.
8.76 (10), 4.39 (10), 1.996 (7), 2.91 (6), 2.81 (5), 2.62 (5), 2.28 (5)

Chemistry:

	(1)	(2)
Fe	1.34	
Ca	28.12	27.58
O	[9.08]	12.20
S	19.56	
S^s		6.11
S^p		7.25
S^t		6.20
OH		9.46
H_2O	41.9	31.20
Total	[100.00]	100.00

(1) Chelyabinsk coal basin, Russia; H_2O by TGA. (2) Analysis (1) after deduction of Fe as impurity, portlandite 1%, adsorbed H_2O 1%, recasting S as S^s = sulfide S, S^p = polysulfide S, S^t = thiosulfate S; then corresponding to $Ca(S^p_{2.63}S^s_{2.22})_{\Sigma=4.85} \cdot Ca(S^t_{2.25}O_{3.00}) \cdot Ca_{6.00}(OH)_{12.20} \cdot 20.14H_2O$.

Occurrence: Among the melt products of old, burning coal dumps.

Association: Siderite, pyrite, iron, sulfur, oldhamite, portlandite, periclase, troilite, pyrrhotite, fluorite.

Distribution: In the Chelyabinsk coal basin, Southern Ural Mountains, Russia.

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Type Material: Mining Institute, St. Petersburg, 1956/1; Il'menskii Preserve Museum, Miass, Russia, 5873–5875; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia.

References: (1) Chesnokov, B.V., V.O. Polyakov, and A.F. Bushmakin (1987) Bazhenovite $CaS_5 \cdot CaS_2O_3 \cdot 6Ca(OH)_2 \cdot 20H_2O$ – a new mineral. Zap. Vses. Mineral. Obshch., 116, 737–743 (in Russian). (2) (1989) Amer. Mineral., 74, 500 (abs. ref. 1). (3) (1988) Mineral. Abs., 39, 495–496 (abs. ref. 1).