# Barite $BaSO_4$



**Crystal Data:** Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Commonly in well-formed crystals, to 85 cm, with over 70 forms noted. Thin to thick tabular {001}, {210}, {101}, {011}; also prismatic along [001], [100], or [010], equant. As crested to rosettelike aggregates of tabular individuals, concretionary, fibrous, nodular, stalactitic, may be banded; granular, earthy, massive.

**Physical Properties:** *Cleavage:* {001}, perfect; {210}, less perfect; {010}, imperfect. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 3–3.5 D(meas.) = 4.50 D(calc.) = 4.47 May be thermoluminescent, may fluoresce and phosphoresce cream to spectral colors under UV.

**Optical Properties:** Transparent to translucent. *Color:* Colorless, white, yellow, brown, gray, pale shades of red, green, blue, may be zoned, or change color on exposure to light; colorless or faintly tinted in transmitted light. *Streak:* White. *Luster:* Vitreous to resinous, may be pearly. *Optical Class:* Biaxial (+). *Pleochroism:* Weak. *Orientation:* $X = c$; $Y = b$; $Z = a$. *Dispersion:* $r > v$, weak. *Absorption:* $Z > Y > X$. $\alpha = 1.636$ $\beta = 1.637$ $\gamma = 1.648$ 2V(meas.) = 36°–40°

**Cell Data:** *Space Group: Pnma.* $a = 8.884(2)$ $b = 5.457(3)$ $c = 7.157(2)$ $Z = 4$

**X-ray Powder Pattern:** Synthetic.
3.445 (100), 3.103 (95), 2.121 (80), 2.106 (75), 3.319 (70), 3.899 (50), 2.836 (50)

**Chemistry:**

| | (1) | (2) |
|---|---|---|
| $SO_3$ | 34.21 | 34.30 |
| CaO | 0.05 | |
| BaO | 65.35 | 65.70 |
| Total | 99.61 | 100.00 |

(1) Svárov, Czech Republic. (2) $BaSO_4$.

**Polymorphism & Series:** Forms a series with celestine.

**Mineral Group:** Barite group.

**Occurrence:** A gangue mineral in low-temperature hydrothermal veins; in residual deposits from weathered barite-bearing limestones; an accessory mineral in igneous rocks; in carbonatites; a primary component of submarine volcanogenic massive sulfide deposits and sea-floor chimneys.

**Association:** Fluorite, calcite, dolomite, rhodochrosite, gypsum, sphalerite, galena, stibnite.

**Distribution:** The most common barium mineral; many localities, even for fine crystals. From Alston Moor, Frizington, Cleator Moor, and elsewhere in Cumbria, England. At Baia Sprie (Felsőbánya) and Cavnic (Kapnikbánya), Romania. From Příbram, Czech Republic. In Germany, from the Beihilfe mine, near Freiberg, and the Pöhla mine, Schwarzemberg, Saxony; in the Clara mine, near Oberwolfach, Black Forest, and at many other places. In the Rock Candy mine, north of Grand Forks, British Columbia, Canada. In the USA, from the Book Cliffs, near Grand Junction, Mesa Co., at Stoneham, Weld Co., in the Bulldog Mountain mine, Creede District, Mineral Co., and elsewhere in Colorado; at Elk Creek and Box Elder Creek, Meade and Pennington Cos., South Dakota; from Palos Verdes, Los Angeles Co., California; in the Magma mine, Superior, Gila Co., Arizona; very fine crystals from the Miekle mine, Elko Co., Nevada. At the El Solar mine, Taxco, Guerrero, Mexico. Immense crystals from the Elandsrand gold mine, Carletonville, South Africa.

**Name:** From the Greek for *weight*, in allusion to the high specific gravity.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 408–415. (2) Chang, L.L.Y., R.A. Howie, and J. Zussman (1996) Rock-forming minerals, (2nd edition), v. 5B, non-silicates, 3–29. (3) Miyake, M., I. Minato, H. Morikawa, and S. Iwai (1978) Crystal structures and sulphate force constants of barite, celestite, and anglesite. Amer. Mineral., 63, 506–510. (4) Jacobsen, S.D., J.R. Smyth, R.J. Swope, and R.T. Downs (1998) Rigid-body character of the $SO_4$ groups in celestine, anglesite, and barite. Can. Mineral., 36, 1053–1060. (5) (1972) NBS Mono. 25, 10, 12.