

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Pseudohexagonal dipyramidal due to repeated twinning, short prismatic to elongated along [001], {010}, {021}, {012}, other faces commonly rough and horizontally striated, to 12 cm. May be botryoidal to spherical, columnar fibrous, granular, massive. *Twinning:* On {110}, universal.

Physical Properties: *Cleavage:* On {010}, distinct; on {110}, {012}, poor. *Fracture:* Uneven. Hardness = 3–3.5 D(meas.) = 4.22–4.31 D(calc.) = 4.24–4.29 Fluorescent and phosphorescent under UV, X-rays, and electron beams.

Optical Properties: Transparent to translucent. *Color:* Colorless, white, pale gray, may be tinted pale yellow, pale brown, or pale green; colorless in transmitted light. *Streak:* White. *Luster:* Vitreous, resinous on fractures.

Optical Class: Biaxial (-). *Orientation:* $X = c; Y = b; Z = a$. *Dispersion:* $r > v$, very weak. $\alpha = 1.529$ $\beta = 1.676$ $\gamma = 1.677$ $2V(\text{meas.}) = 16^\circ$

Cell Data: *Space Group:* $Pm\bar{c}n$ (synthetic). $a = 5.314$ $b = 8.904$ $c = 6.430$ $Z = 4$

X-ray Powder Pattern: Synthetic.

3.72 (100), 3.68 (53), 2.150 (28), 2.628 (24), 2.590 (23), 2.019 (21), 3.215 (15)

Chemistry:

	(1)	(2)
CO ₂	[22.50]	22.30
CaO	0.08	
SrO	0.68	
BaO	77.15	77.70
Total	[100.41]	100.00

(1) Anglezark, England; by electron microprobe, CO₂ calculated for stoichiometry; corresponds to (Ba_{0.99}Sr_{0.01})_{Σ=1.00}CO₃. (2) BaCO₃.

Polymorphism & Series: Forms a series with strontianite.

Mineral Group: Aragonite group.

Occurrence: Usually in minor amounts in low-temperature hydrothermal veins, typically an alteration product of barite; may be of anoxic sedimentary origin, barium supplied by volcanic hot-spring activity; uncommon in coal measures.

Association: Barite, fluorite, calcite, galena.

Distribution: Only a few localities are given here; in England, from Alston Moor, Cumbria; fine crystals from the Settlingstones mine, near Fourstones, and at Fallowfield, near Hexham, Northumberland. From Leogang and at Peggau, north of Graz, Styria, Austria. At Příbram, Czech Republic. From Freiberg and St. Andreasberg, Harz Mountains, Germany. In the Arkhyz deposit, Caucasus Mountains, Russia. In the USA, fine large crystals from several mines around Rosiclare, as in the Minerva #2 mine, Cave-in-Rock, Hardin Co., Illinois; at Pigeon Roost, Montgomery Co., Arkansas. In the Jason Pb–Zn deposits, Macmillan Pass, Yukon Territory, Canada. Large deposits occur from Ziyang to Chengkou, along the boundary between Shaanxi and Sichuan Provinces, China. At the Hasei mine, Akita Prefecture, Japan. In the Hunter Valley coal deposits, New South Wales, Australia.

Name: In honor of Dr. William Withering (1741–1799), English physician and mineralogist, who first noted the mineral.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 194–196. (2) Chang, L.L.Y., R.A. Howie, and J. Zussman (1996) Rock-forming minerals, (2nd edition), v. 5B, non-silicates, 263–271. (3) De Villiers, J.P.R. (1971) Crystal structures of aragonite, strontianite, and witherite. *Amer. Mineral.*, 56, 758–767. (4) Baldasari, A. and J.A. Speer (1979) Witherite composition, physical properties, and genesis. *Amer. Mineral.*, 64, 742–747. (5) (1953) *NBS Circ.* 539, 2, 54.

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