Fluorite CaF_2

Crystal Data: Cubic. *Point Group:* $4/m\bar{3}2/m$. Cubes, octahedra, rarely dodecahedra, or combinations, with many other forms; rounded or stepped, to 2 m; nodular, botryoidal, rarely columnar or fibrous; granular, massive. *Twinning:* Common on {111}, interpenetrant, flattened.

Physical Properties: *Cleavage:* {111}, perfect; on {011}, parting, poor. *Fracture:* Subconchoidal to uneven. *Tenacity:* Brittle. Hardness = 4 VHN = 174–181 {100}, 174–203 {111} (100 g load). D(meas.) = 3.175–3.184; to 3.56 if high in rare-earth elements. D(calc.) = 3.180 Fluoresces blue, violet, green, yellow, red under UV; may be phosphorescent, thermoluminescent, or triboluminescent.

Optical Properties: Transparent to translucent. *Color:* Colorless, white, purple, blue, green, yellow, orange; red, pink, brown, bluish black; commonly zoned; in transmitted light, colorless, may be colored in thick sections. *Streak:* White. *Luster:* Vitreous; dull when massive. *Optical Class:* Isotropic; weak anomalous anisotropism. $n = 1.433$–1.448

Cell Data: *Space Group:* $Fm3m$. a = 5.4626 Z = 4

X-ray Powder Pattern: Synthetic.
1.931 (100), 3.153 (94), 1.647 (35), 1.1150 (16), 1.366 (12), 1.253 (10), 0.8637 (9)

Chemistry:

	(1)	(2)		(1)	(2)
SiO_2	0.05		F	48.29	48.67
MgO	0.03		LOI	0.22	
Ca	51.24	51.33	Total	99.83	100.00

(1) Corvara, Trentino-Alto Adige, Italy. (2) CaF_2.

Occurrence: An accessory mineral in granite, granite pegmatites, syenites; around fumaroles; in carbonatites and alkaline intrusives. Economic deposits in low- to high-temperature hydrothermal veins and stratabound deposits; a cement in sandstones.

Association: Quartz, dolomite, calcite, barite, celestine, sulfides, cassiterite, topaz, wolframite, scheelite, apatite.

Distribution: Notable occurrences include: in England, from many localities in Cornwall; in Durham, as at Weardale; from Castleton, Derbyshire. In France, at Bex, Var; Le Beix, Puy de Dôme; and on Mont Blanc, near Chamonix, Haute-Savoie. On the Göscheneralp, Uri, Switzerland. From Wölsendorf, Bavaria, and in the Clara Mine, near Oberwolfach, Black Forest, Germany. Around Berbes, Asturias Province, Spain. At the Nikolaev mine, Dal'negorsk, Russia. From Kara Oba, Kazakhstan. At Xianghuapu, Hunan Province, China. In Mexico, from Naica, Chihuahua; Musquiz, Coahuila; and the Ojuela mine, Mapimí, Durango. In the USA, from Macomb, St. Lawrence Co., and Penfield, Monroe Co., New York; at Clay Center, Ottawa Co., Ohio; from Rosiclare and Cave-in-Rock, Hardin Co., Illinois; at the Elmwood mine, Smith Co., Tennessee; in the Sunnyside mine, San Juan Co., Colorado; from the Pine Canyon deposit, Burro Mountains, Grant Co., New Mexico. In Canada, from Madoc, Ontario, and in the Rock Candy mine, near Grand Forks, British Columbia. From Huanzala, Huanuco, Peru. At Okorusu, Namibia. In Pakistan, at Nagar, near Karimabad, Gilgit district.

Name: From the Latin *to flow*, in allusion to its low melting point.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 29–37. (2) Deer, W.A., R.A. Howie, and J. Zussman (1962) Rock-forming minerals, v. 5, non-silicates, 348–356. (3) Westbrook, J.H. and P.J. Jorgensen (1968) Effects of water desorption on indentation microhardness anisotropy in minerals. Amer. Mineral., 53, 1899–1909. (4) (1953) NBS Circ. 539, 1, 69.