Anhydrite CaSO_4

Crystal Data: Orthorhombic. Point Group: 2/m 2/m 2/m. Crystals tabular on {010}, {100}, or {001} or equant with large pinacoidal faces; elongated along [100] or [001], to 15 cm, with about 40 forms recorded. Typically granular, nodular, parallel or divergent fibrous, massive. Twinning: Simple or repeatedly on {011}, common; contact twins rare on {100}.

Physical Properties: Cleavage: On {010}, perfect; on {100} nearly perfect; on {001} good to imperfect, yielding pseudocubic fragments. Fracture: Uneven to splintery. Tenacity: Brittle. Hardness = 3–3.5 D(meas.) = 2.98(1) D(calc.) = 2.95

Optical Properties: Transparent to translucent. Color: Colorless to pale blue or violet if transparent; white, mauve, rose, pale brown or gray from included impurities; colorless in transmitted light. Streak: White to pale gray. Luster: Pearly on {010}, vitreous to greasy on {100}; vitreous on {100}. Optical Class: Biaxial (+). Pleochroism: For violet varieties; X = colorless to pale yellow or rose; Y = pale violet or rose; Z = violet. Orientation: X = b, Y = a, Z = c. Dispersion: r < v, strong. Absorption: Z > Y > X. α = 1.567–1.574 β = 1.574–1.579 γ = 1.609–1.618 2V(meas.) = 42°–44°

Cell Data: Space Group: Amma. a = 6.993(2) b = 6.995(2) c = 6.245(1) Z = 4

X-ray Powder Pattern: Synthetic. 3.499 (100), 2.849 (29), 2.3282 (20), 2.2090 (20), 1.8692 (16), 1.6483 (15), 1.7500 (11)

Chemistry:

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\begin{array}{ccc}
\text{SO}_3 & 58.37 & 58.81 \\
\text{CO}_2 & 0.17 & & \\
(\text{Al,Fe})_2\text{O}_3 & 0.06 & & \\
\text{CaO} & 41.13 & 41.19 \\
\text{FeS}_2 & & 0.02 \\
\text{Total} & 99.75 & 100.00 \\
\end{array}
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(1) Yonaibata mine, Hukusima Prefecture, Japan; after deduction of CO_2 as calcite, corresponds to Ca_{0.99}S_{1.06}O_4. (2) CaSO_4.

Occurrence: A major component in sedimentary evaporite deposits and in the cap rocks above salt domes, commonly formed by dehydration of gypsum; in igneous rocks, fumarolic deposits, and in seafloor hydrothermal chimneys, also an alteration product in hydrothermal mineral deposits.

Association: Gypsum, halite, sylvaite, polyhalite, dolomite, calcite, magnesite, celestine, sulfur.


Name: From the Greek for without water, in contrast to hydrous calcium sulfate minerals.

Type Material: Mining Academy, Freiberg, Germany, 16538.