Rhodochrosite $Mn^{2+}CO_3$

Crystal Data: Hexagonal. *Point Group:* $\bar{3}\ 2/m$. Crystals are rhombohedra $\{10\bar{1}1\}$ or scalenohedra $\{21\bar{3}1\}$, to 12 cm, modified by $\{0001\}$, $\{10\bar{1}0\}$, $\{11\bar{2}0\}$, with several other forms, may be rounded or saddle-shaped. Commonly in bladed aggregates, columnar, stalactitic, botryoidal, compact granular, massive. *Twinning:* On $\{10\bar{1}2\}$, contact and lamellar, then flattened.

Physical Properties: *Cleavage:* $\{10\bar{1}1\}$, perfect; $\{01\bar{1}2\}$, a parting. *Fracture:* Uneven to conchoidal. *Tenacity:* Brittle. Hardness = 3.5–4 D(meas.) = 3.70 D(calc.) = 3.70

Optical Properties: Transparent to translucent. *Color:* Pink, rose-red, cherry-red, yellow, yellowish gray, cinnamon-brown, may be banded; pale rose to colorless in transmitted light. *Streak:* White. *Luster:* Vitreous, pearly in aggregates.
Optical Class: Uniaxial (–). *Pleochroism:* Faint. *Absorption:* $O > E$. $\omega = 1.810$ $\epsilon = 1.597$

Cell Data: *Space Group:* $R\bar{3}c$ (synthetic). $a = 4.777$ $c = 15.67$ Z = 6

X-ray Powder Pattern: Synthetic.
2.84 (100), 3.66 (35), 1.763 (35), 1.770 (30), 2.172 (25), 2.000 (25), 2.39 (20)

Chemistry:

	(1)	(2)
CO_2	38.26	38.29
FeO	0.77	
MnO	60.87	61.71
MgO	trace	
CaO	0.51	
Total	100.41	100.00

(1) Ljubija district, Bosnia-Herzegovina. (2) $MnCO_3$.

Polymorphism & Series: Forms two series, with calcite and with siderite.

Mineral Group: Calcite group.

Occurrence: A primary mineral in low- to moderate-temperature hydrothermal veins; in metamorphic deposits; common in carbonatites; authigenic and secondary in sediments; uncommon in granite pegmatites.

Association: Calcite, siderite, dolomite, fluorite, barite, quartz, pyrite, tetrahedrite, sphalerite, hübnerite (hydrothermal); rhodonite, garnet, alabandite, hausmannite (metamorphic).

Distribution: Numerous localities; only a few for fine specimens are listed. From Cavnic (Kapnikbánya) and Herja (Kisbánya), Baia Mare (Nagybánya) district, Romania. In the Wolf mine, near Herdorf, Westphalia, Germany. In Russia, from the Vuoriyarvi carbonatite complex and the Kovdor massif, Kola Peninsula. Large twinned crystals at Mont Saint-Hilaire, Quebec, Canada. In the USA, from the Emma mine, Butte, Silver Bow Co., Montana; in Colorado, at many localities, as fine large crystals in the Home Sweet Home mine, Alma, Park Co., from the Climax mine, Lake Co., in the Sunnyside mine, near Silverton, San Juan Co., and the Mountain Monarch mine, Ouray Co. In Mexico, from Cananea, Sonora, and Santa Eulalia, Chihuahua. Large crystals from the Huallapón mine, Pasto Bueno, Ancash Department, and in the Uchuc-Chacua deposit, Cajatambo Province, Peru. In Province, Peru. A large deposit of ornamental banded material at the Capillitas mine, San Luis, Catamarca Province, Argentina. Exceptional crystals from the Hotazel and N'Chwaning mines, near Kuruman, Cape Province, South Africa. From the Inakuraishi and Yakumo mines, Hokkaido, Japan.

Name: From the Greek *rhodon*, for *rose*, and *chrosis*, for *coloring*.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 171–175. (2) Deer, W.A., R.A. Howie, and J. Zussman (1962) Rock-forming minerals, v. 5, non-silicates, 263–271; Chang, L.L.Y., R.A. Howie, and J. Zussman (1996) Rock-forming minerals, (2nd edition), v. 5B, non-silicates, 150–162. (3) Effenberger, H., K. Mereiter, and J. Zemann (1981) Crystal structure refinements of magnesite, rhodochrosite, siderite, smithsonite, and dolomite, with discussion of some aspects of the stereochemistry of calcite type carbonates. Zeits. Krist., 156, 233–243. (4) (1957) NBS Circ. 539, 7, 32.