

Crystal Data: Orthorhombic. *Point Group:* 222. Anhedral to platy crystals, to 400 μm, aggregated into porcelaneous crusts.

Physical Properties: *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 3–3.5
D(meas.) = n.d. D(calc.) = 7.31–7.59

Optical Properties: Opaque. *Color:* White; white in reflected light, due to white internal reflections. *Streak:* White. *Luster:* Waxy.
Optical Class: Biaxial. $n = [2.09]$ $\alpha = \text{n.d.}$ $\beta = \text{n.d.}$ $\gamma = \text{n.d.}$ $2V(\text{meas.}) = \text{n.d.}$

Cell Data: *Space Group:* P2₁2₁2₁ (synthetic). $a = 9.014(1)$ $b = 9.315(1)$ $c = 5.1465(7)$
Z = 4

X-ray Powder Pattern: Grand Reef mine, Arizona, USA.
3.215 (100), 3.181 (90), 4.02 (40), 2.858 (40), 2.564 (35), 6.49 (30), 4.14 (30)

Chemistry:	(1)	(2)
CO ₂	9.70	8.97
PbO	89.9	91.03
Total	99.6	100.00

(1) Grand Reef mine, Arizona, USA; by electron microprobe, CO₂ by CHN analyzer; corresponding to Pb_{1.91}O(C_{1.05}O₃). (2) Pb₂O(CO₃).

Occurrence: A rare secondary mineral formed in the oxidation zone, probably by acidic groundwater reacting with cerussite, in a lead ore deposit (Grand Reef mine, Arizona, USA).

Association: Cerussite, litharge, massicot, minium, hydrocerussite, fluorite, plumbojarosite, hematite, manganese oxides, quartz, muscovite (Grand Reef mine, Arizona, USA).

Distribution: From the Grand Reef mine, about six km northeast of Klondyke, Aravaipa district, Graham Co., Arizona, USA.

Name: Honors David Michael Shannon (1942–2003?2002??ck??), mineral dealer and collector, Mesa, Arizona, USA, who provided the original material.

Type Material: Canadian Geological Survey, Ottawa, Canada, 67216; The Natural History Museum, London, England, 1993,487.

References: (1) Roberts, A.C., J.A.R. Sterling, G.J.C. Carpenter, A.J. Criddle, G.C. Jones, T.C. Birkett, and W.D. Birch (1995) Shannonite, Pb₂OCO₃, a new mineral from the Grand Reef mine, Graham County, Arizona, USA. *Mineral. Mag.*, 59, 305–310. (2) (1996) *Amer. Mineral.*, 81, 252 (abs. ref. 1). (3) Krivovichev, S.V. and P.C. Burns (2000) Crystal chemistry of basic lead carbonates. II. Crystal structure of synthetic shannonite. *Mineral. Mag.*, 64, 1063–1068.