

Petterdite**PbCr₂³⁺(CO₃)₂(OH)₄•H₂O**

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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As crystals, to 15 μm , roughly rectangular, flattened on {010} and elongated along [001] or [100], with frayed and corroded terminations in the direction of [001]. These are loosely stacked and randomly aggregated in botryoidal, earthy to porous crusts.

Physical Properties: *Cleavage:* On {100}, fair; on {010}, possible. *Hardness* = ~ 2 (by analogy with dundasite). *D(meas.)* = n.d. *D(calc.)* = 3.947

Optical Properties: *Translucent.* *Color:* Pale to deep lilac, pinkish violet, pale gray. *Streak:* Pale violet. *Luster:* Pearly to earthy. *Optical Class:* Biaxial (-). *Pleochroism:* $X = Y$ = colorless to pale grayish pink; Z = grayish pink. *Orientation:* $X = a$; $Y = b$; $Z = c$. *Absorption:* $X < Z$. $\alpha = 1.704(5)$ $\beta = \sim 1.802$ $\gamma = 1.842(5)$ $2V(\text{meas.}) = \text{n.d.}$ $2V(\text{calc.}) = \sim 62^\circ$

Cell Data: *Space Group:* [*Pbnm*] (by analogy to dundasite). $a = 9.079(3)$ $b = 16.321(9)$ $c = 5.786(7)$ $Z = 4$

X-ray Powder Pattern: Red Lead mine, Tasmania, Australia. 7.937 (100), 3.633 (70), 4.686 (50b), 3.270 (40), 2.718 (40), 2.690 (40), 6.091 (30)

Chemistry:	(1)	(2)
Sb ₂ O ₅	0.67	
CO ₂	18.3	17.02
Cr ₂ O ₃	22.64	29.38
Al ₂ O ₃	3.65	
PbO	43.33	43.15
SrO	1.40	
H ₂ O	[10.01]	10.45
Total	[100.00]	100.00

(1) Red Lead mine, Tasmania, Australia; by electron microprobe, total Sb as Sb₂O₅, total Cr as Cr₂O₃, CO₂ by CHN analyzer, H₂O by difference; presence of (CO₃)²⁻, (OH)¹⁻, and H₂O confirmed by IR; corresponds to (Pb_{0.99}Sr_{0.07})_{Σ=1.06}(Cr_{1.52}Al_{0.36}Sb_{0.02})_{Σ=1.90}(CO₃)_{2.12}(OH)_{3.62}•1.02H₂O. (2) PbCr₂(CO₃)₂(OH)₄•H₂O.

Occurrence: A rare secondary species probably formed by alteration of galena by Cr-bearing meteoric waters (Red Lead mine, Australia); in the oxidation zone of a hydrothermal vein cutting serpentinite (Callenberg mine, Germany).

Association: Anglesite, crocoite, "limonite" (Red Lead mine, Australia); crocoite, cerussite, bindheimite, pyromorphite, galena (Callenberg mine, Germany).

Distribution: From the Red Lead mine, Dundas, Tasmania, Australia. In the Callenberg nickel mine, near Hohenstein-Ernstthal, Saxony, Germany.

Name: Honors William Frederick Petterd (1849–1910), mineral collector who published several catalogs of Tasmanian mineral occurrences.

Type Material: Museum Victoria, Melbourne, Australia, M38601.

References: (1) Birch, W.D., U. Kolitsch, T. Witzke, L. Nasdala, and R.S. Bottrill (2000) Petterdite, the Cr-dominant analogue of dundasite, a new mineral species from Dundas, Tasmania, Australia and Callenberg, Saxony, Germany. *Can. Mineral.*, 38, 1467–1476. (2) (2001) *Amer. Mineral.*, 86, 1113 (abs. ref. 1).

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