

**Decrespignyite-(Y)** **$\text{Y}_4\text{Cu}(\text{CO}_3)_4\text{Cl}(\text{OH})_5 \cdot 2\text{H}_2\text{O}$** 

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**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ , 2, or  $m$ . Rarely as thin pseudo-hexagonal crystals, to 50  $\mu\text{m}$ , commonly curved; in stellate rosettes and as massive crusts and coatings.

**Physical Properties:** Hardness =  $\sim 4$  D(meas.) = 3.64(2) D(calc.) = [3.92]

**Optical Properties:** Transparent. *Color:* Deep Royal blue to turquoise-blue; very pale blue in transmitted light. *Streak:* Pale blue. *Luster:* Vitreous to pearly.

*Optical Class:* Biaxial (-). *Pleochroism:* Medium strong;  $X$  = very pale blue;  $Y = Z$  = greenish blue. *Absorption:*  $Z \simeq Y \gg X$ .  $\alpha = 1.604(4)$   $\beta = \simeq 1.638$   $\gamma = 1.638(3)$  2V(meas.) = Very small.

**Cell Data:** *Space Group:*  $P2_1/m$ ,  $P2_1$ , or  $Pm$ .  $a = 8.899(6)$   $b = 22.77(2)$   $c = 8.589(6)$   $\beta = 120.06(5)^\circ$   $Z = 4$

**X-ray Powder Pattern:** Paratoo mine, Australia.

6.241 (100), 7.086 (50), 3.530 (40), 22.8 (30), 7.463 (30), 4.216 (30), 3.336 (30)

**Chemistry:**

	(1)		(1)
$\text{CO}_2$	19.8	$\text{H}_2\text{O}_3$	2.6
$\text{Y}_2\text{O}_3$	42.2	$\text{Er}_2\text{O}_3$	2.5
$\text{La}_2\text{O}_3$	0.3	$\text{CuO}$	10.9
$\text{Pr}_2\text{O}_3$	0.1	$\text{CaO}$	0.5
$\text{Nd}_2\text{O}_3$	1.3	$\text{Cl}$	3.0
$\text{Sm}_2\text{O}_3$	1.0	$\text{H}_2\text{O}$	10.8
$\text{Gd}_2\text{O}_3$	4.8	$-\text{O} = \text{Cl}_2$	0.7
$\text{Tb}_2\text{O}_3$	0.4	Total	103.2
$\text{Dy}_2\text{O}_3$	3.7		

(1) Paratoo mine, Australia; by electron microprobe, average of seven analyses,  $\text{CO}_2$  and  $\text{H}_2\text{O}$  by CHN analyzer, presence of  $\text{CO}_3^{2-}$  and  $\text{H}_2\text{O}$  confirmed by IR; corresponds to  $(\text{Y}_{3.32}\text{Gd}_{0.24}\text{Dy}_{0.18}\text{Ho}_{0.11}\text{Er}_{0.12}\text{Ca}_{0.08}\text{Nd}_{0.07}\text{Sm}_{0.05}\text{Tb}_{0.02}\text{La}_{0.02})_{\Sigma=4.22}\text{Cu}_{1.22}(\text{CO}_3)_{4.00}\text{Cl}_{0.75}(\text{OH})_{6.27} \cdot 2.20\text{H}_2\text{O}$ .

**Occurrence:** A rare secondary mineral in the oxidized zone of a copper deposit, the source of rare-earths enigmatic, perhaps from surrounding sediments.

**Association:** Caysichite-(Y), donnayite-(Y), kamphaugite-(Y), malachite, nontronite, calcite, gypsum, "limonite".

**Distribution:** From the Paratoo copper mine, 30 km southwest of Yunta, Olary district, South Australia.

**Name:** Honors Robert James Champion de Crespigny (1950–), Chairman of Normandy Mining Limited and Chairman of the South Australian Museum, for his contributions to Australian education.

**Type Material:** South Australian Museum, Adelaide, Australia, G25453–G25455.

**References:** (1) Wallwork, K., U. Kolitsch, A. Pring, and L. Nasdala (2002) Decrespignyite-(Y), a new copper yttrium rare earth carbonate chloride hydrate from Paratoo, South Australia. Mineral. Mag., 66, 181–188. (2) (2002) Amer. Mineral., 87, 1731 (abs. ref. 1).