

Hydroxycalciopyrochlore

Crystal Data: Isometric. *Point Group:* $4/m\bar{3}2/m$. As octahedral crystals, to 1 mm; also in combination with dodecahedra and tetrahexahedra.

Physical Properties: *Cleavage:* None. *Fracture:* Conchoidal. *Tenacity:* Brittle. *Metamict.* Hardness = 5-6 VHN = 572 D(meas.) = 5.10(3) D(calc.) = 5.15

Optical Properties: Translucent. *Color:* Brownish black, greenish black, black; brown in transmitted light, gray in reflected light. *Streak:* Brown. *Luster:* Adamantine to greasy. *Optical Class:* Isotropic. $n(\text{calc.}) = > 1.9$
R: (400) 18.6, (460) 12.9, (480) 12.7, (540) 13.3, (560) 11.6, (580) 11.2, (600) 11.7, (640) 11.3, (660) 12.2, (700) 14.5

Cell Data: *Space Group:* $Fd\bar{3}m$. $a = 10.381(4)$ $Z = 8$

X-ray Powder Pattern: Maoniuping mine, Sichuan Province, China. [After heating.]
2.966 (100), 1.814 (34), 1.546 (21), 2.569 (18), 1.480 (5), 1.2815 (5), 1.1776 (5)

Chemistry:	(1)		(1)
Nb ₂ O ₅	36.36	CaO	9.89
Ta ₂ O ₅	1.78	FeO	0.42
TiO ₂	15.23	MgO	0.08
Al ₂ O ₃	0.15	Na ₂ O	4.25
Ce ₂ O ₃	2.02	F	0.38
Y ₂ O ₃	0.13	H ₂ O	[2.15]
UO ₂	25.87	$\frac{-O = F_2}{\text{Total}}$	$\frac{0.16}{98.92}$
ThO ₂	0.26		
PbO	0.11		

(1) Maoniuping mine, Sichuan Province, China; average of 10 electron microprobe analyses, H₂O from stoichiometry and confirmed by Raman spectroscopy; corresponding to (Ca_{0.74}Na_{0.58}U_{0.40}Ce_{0.05}Fe_{0.02} \square _{0.21}) $\Sigma=2.00$ (Nb_{1.15}Ti_{0.80}Ta_{0.03}Al_{0.01}Mg_{0.01}) $\Sigma=2.00$ O_{6.02}[(OH)_{1.01}F_{0.09}] $\Sigma=1.10$.

Mineral Group: Pyrochlore supergroup, pyrochlore group.

Occurrence: In a rare-earth deposit in an alkali feldspar granite.

Association: Calcite, barite, celestine, albite, aegirine, aegirine-augite, fluorite, parasite-(Ce), thorite, thorianite, zircon, galena, sphalerite, magnetite, pyrite.

Distribution: At the Maoniuping mine, Mianning County, Xichang prefecture, Sichuan Province, southwest People's Republic of China.

Name: For a member of the *pyrochlore* group with dominant hydroxol in the Y structural site and calcium in the A structural site.

Type Material: At the Geological Museum of China, Beijing, P.R. China (M11800).

References: (1) Yang, G., G. Li, M. Xiong, B. Pan, and C. Yan (2014) Hydroxycalciopyrochlore, a new mineral species from Sichuan, China. *Acta Geologica Sinica (English Edition)*, 88(3), 748-753. (2) (2015) *Amer. Mineral.*, 100, 2357-2360 (abs. ref. 1).