

**Crystal Data:** Monoclinic; commonly metamict. *Point Group:* 2/m. Subhedral to anhedral, massive, to 5 cm.

**Physical Properties:** *Cleavage:* {010}, distinct; {100}, difficult; {001}, a parting, poor. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 5 D(meas.) = 5.28 D(calc.) = 5.29 Radioactive.

**Optical Properties:** Semitransparent. *Color:* Pale green to dark green, honey-brown to yellow-brown; pale green or pale brown in transmitted light. *Streak:* White. *Luster:* Resinous or greasy to vitreous.

*Optical Class:* Biaxial (+). *Pleochroism:* Faint; X = Y = green; Z = yellowish green. *Orientation:* X = b; Z ∧ c = 7°. α = 1.779(2) β = 1.780(2) γ = 1.817(3) 2V(meas.) = 17°–20° 2V(calc.) = 17.9°

**Cell Data:** *Space Group:* P2<sub>1</sub>/n. a = 6.747–6.767 b = 6.960–6.975 c = 6.453–6.471 β = 103.71°–103.89° Z = 4

**X-ray Powder Pattern:** Kuttankuli, India.

3.074 (100), 2.862 (65), 3.277 (58), 3.481 (30), 4.167 (25), 2.177 (22), 4.664 (20)

Chemistry:	(1)	(2)	(1)	(2)	(1)	(2)	
U <sub>3</sub> O <sub>8</sub>	4.33		Ce <sub>2</sub> O <sub>3</sub>	12.12	20.65	Dy <sub>2</sub> O <sub>3</sub>	0.06
P <sub>2</sub> O <sub>5</sub>	27.10	20.20	Pr <sub>2</sub> O <sub>3</sub>	1.20		Ho <sub>2</sub> O <sub>3</sub>	0.01
SiO <sub>2</sub>	2.08	6.09	Nd <sub>2</sub> O <sub>3</sub>	5.91		Er <sub>2</sub> O <sub>3</sub>	0.03
ThO <sub>2</sub>	31.64	28.20	Sm <sub>2</sub> O <sub>3</sub>	1.81		Tm <sub>2</sub> O <sub>3</sub>	0.12
Al <sub>2</sub> O <sub>3</sub>		0.29	Eu <sub>2</sub> O <sub>3</sub>	0.25		Fe <sub>2</sub> O <sub>3</sub>	1.13
Y <sub>2</sub> O <sub>3</sub>	0.08	0.94	Gd <sub>2</sub> O <sub>3</sub>	0.45		PbO	1.15
La <sub>2</sub> O <sub>3</sub>	5.19	21.63	Tb <sub>2</sub> O <sub>3</sub>	0.05		CaO	5.99
						Total	99.57
							99.23

(1) Kuttankuli, India; by electron microprobe, corresponding to [Th<sub>0.29</sub>Ca<sub>0.26</sub>Ce<sub>0.18</sub>Nd<sub>0.08</sub>La<sub>0.08</sub>U<sub>0.04</sub>Sm<sub>0.02</sub>Pr<sub>0.02</sub>Pb<sub>0.01</sub>Gd<sub>0.01</sub>(Eu, Y, Tm, Tb, Dy, Er, Ho)<sub>0.01</sub>]<sub>Σ=0.99</sub>(P<sub>0.92</sub>Si<sub>0.08</sub>)<sub>Σ=1.00</sub>O<sub>4</sub>.  
 (2) Ratnapura, Sri Lanka; corresponding to [Ce<sub>0.32</sub>Th<sub>0.27</sub>(La, Pr, Nd)<sub>0.34</sub>Fe<sub>0.05</sub>Y<sub>0.02</sub>Al<sub>0.01</sub>]<sub>Σ=1.01</sub>(P<sub>0.73</sub>Si<sub>0.26</sub>)<sub>Σ=0.99</sub>O<sub>4</sub>.

**Mineral Group:** Monazite group.

**Occurrence:** Disseminated in a kaolinized pegmatite dike and surrounding kaolinized granite gneiss; alluvial (Kuttankuli, India); in a carbonatite (Mt. Weld, Western Australia).

**Association:** Tourmaline, chrysoberyl, zircon, quartz (Kuttankuli, India).

**Distribution:** From Kuttankuli (Kuttakuzhi), about 42 km east-southeast of Trivandrum, Kerala State, India. At Ratnapura, Sri Lanka. In the Mt. Weld carbonatite, 35 km south of Laverton, Western Australia. At Binghampton, Broome Co., New York, and in the Uranium King mine, Encampment, Carbon Co., Wyoming, USA.

**Name:** For *Chera* (Kerala), an ancient Dravidian kingdom predating Travancore (now Kerala State), India, and its dominant *cerium* content.

**Type Material:** Institute of Geological Sciences, London, MI 28881; The Natural History Museum, London, England, 1947,344.

**References:** (1) Bowie, S.H.U. and J.E.T. Horne (1953) Cheralite, a new mineral of the monazite group. *Mineral. Mag.*, 30, 93–99. (2) (1954) *Amer. Mineral.*, 39, 403 (abs. ref. 1). (3) Bowles, J.F.W., E.A. Jobbins, and B.R. Young (1980) A re-examination of cheralite. *Mineral. Mag.*, 43, 885–888. (4) Hughes, J.M., E.E. Foord, M.A. Hubbard, and Y. Ni (1995) The crystal structure of cheralite, (Ce, LREE, Ca, Th, U)(P, Si)O<sub>4</sub>, a monazite group mineral. *Neues Jahrb. Mineral., Monatsh.*, 344–350. (5) Foord, E.E., J.J. Fitzpatrick, J.G. Crock, and F.E. Lichte (1992) A further re-examination of cheralite, (LREE, Ca, Th, U)(P, Si)O<sub>4</sub>, from the type locality: Kuttakuzhi, Trivandrum, Kerala State, India. *Trends in Mineral.*, 1, 103–105.