

**Crystal Data:** Monoclinic. *Point Group:* 2/m. Short prismatic crystals, to 2 mm; in fibrous and polycrystalline aggregates. *Twinning:* Simple, lamellar on {100}, {001}.

**Physical Properties:** *Cleavage:* Good on {110}, (110) ∧ (1 $\bar{1}$ 0) ~87°; parting on {001}. Hardness = ~6 D(meas.) = 3.51–3.60 D(calc.) = 3.60

**Optical Properties:** Semitransparent. *Color:* Emerald-green; green or yellow in thin section. *Optical Class:* Biaxial (-). *Pleochroism:* Strong; X = yellowish green; Y = blue-green, grass-green; Z = emerald-green. *Orientation:* Y = b; Z ∧ a = 8°–22°. *Dispersion:* r > v, moderate to strong. α = 1.740–1.766 β = 1.756–1.778 γ = 1.745–1.781 2V(meas.) = 6°–70°

**Cell Data:** *Space Group:* C2/c. a = 9.550 b = 8.712 c = 5.273 β = 107.44° Z = 4

**X-ray Powder Pattern:** Synthetic.

2.956 (100), 2.867 (100), 2.5166 (90), 2.4476 (70), 2.0985 (70), 1.5957 (70), 1.3802 (60)

Chemistry:	(1)	(2)	(1)	(2)
SiO <sub>2</sub>	55.5	54.81	MgO	0.8
TiO <sub>2</sub>		0.03	CaO	1.7
Al <sub>2</sub> O <sub>3</sub>		4.02	Na <sub>2</sub> O	11.6
Fe <sub>2</sub> O <sub>3</sub>	0.2	3.61	K <sub>2</sub> O	0.02
Cr <sub>2</sub> O <sub>3</sub>	30.6	23.67	P <sub>2</sub> O <sub>5</sub>	0.09
MnO		0.02	Total	100.4
				[100.24]

(1) Coahuila meteorite; by electron microprobe, corresponds to (Na<sub>0.83</sub>Ca<sub>0.07</sub>)<sub>Σ=0.90</sub>(Cr<sub>0.90</sub>Mg<sub>0.04</sub>)<sub>Σ=0.94</sub>Si<sub>2.06</sub>O<sub>6</sub>. (2) Myanmar; by electron microprobe, average of seven analyses, average sum originally given as 100.19%; corresponds to (Na<sub>0.93</sub>Ca<sub>0.02</sub>)<sub>Σ=0.95</sub>(Cr<sub>0.69</sub>Al<sub>0.17</sub>Fe<sub>0.10</sub>Mg<sub>0.03</sub>)<sub>Σ=0.99</sub>Si<sub>2.02</sub>O<sub>6</sub>.

**Mineral Group:** Pyroxene group.

**Occurrence:** A major constituent of some jadeitites; an accessory constituent of some iron meteorites.

**Association:** “Cliftonite” [graphite], chromian diopside, troilite (Toluca); daubréelite (Coahuila); krinovite, roedderite, high albite, richterite, chromite (Canyon Diablo); jadeite, chromite, chlorite (Myanmar).

**Distribution:** In the Toluca, Coahuila, Hex River Mountains, and Canyon Diablo meteorites. Around Tawmaw and other towns, Myitkyina-Mogaung district, Kachin State, Myanmar (Burma). At Mocchie, Susa, Piedmont, Italy. From Williams Creek, Mendocino Co., California, USA.

**Name:** From the German *kosmisch*, for *cosmic*, in allusion to its meteoritic occurrence, and the Greek *chlor*, for *green*.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 81869, 81870; The Natural History Museum, London, England, 81869–81870.

**References:** (1) Dana, E.S. (1899) Dana's system of mineralogy, (6th edition), app. I, 20. (2) Deer, W.A., R.A. Howie, and J. Zussman (1978) Rock-forming minerals, (2nd edition), v. 2A, single-chain silicates, 520–525. (3) Frondel, C. and C. Klein, Jr. (1965) Ureyite [kosmochlor], NaCr<sub>2</sub>Si<sub>2</sub>O<sub>6</sub>, a new meteoritic pyroxene. *Science*, 149, 742–744. (4) (1965) *Amer. Mineral.*, 50, 2096 (abs. ref. 3). (5) Clark, J.R., D.E. Appleman, and J.J. Papike (1969) Crystal-chemical characterization of clinopyroxenes based on eight new structure refinements. *MSA Spec. Paper* 2, 31–50. (6) Yang, C.M.O. (1984) A terrestrial source of ureyite [kosmochlor]. *Amer. Mineral.*, 69, 1180–1183. (7) Harlow, G.E. and E.P. Olds (1987) Observations on terrestrial ureyite [kosmochlor] and ureyitic pyroxene. *Amer. Mineral.*, 72, 126–136.

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