

**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3} 2/m$ . Poorly developed stout hexagonal prisms, to a few tenths mm, lacking terminal faces; most material is strongly altered.

**Physical Properties:** Hardness = n.d. D(meas.) = 2.844 D(calc.) = 2.79

**Optical Properties:** Semitransparent. *Color:* Colorless.

*Optical Class:* Uniaxial (-).  $\omega = 1.598(2)$   $\epsilon = 1.598(2)$

**Cell Data:** *Space Group:*  $R\bar{3}m$ .  $a = 10.429(2)$   $c = 13.149(3)$   $Z = 6$

**X-ray Powder Pattern:** Mt. Shaheru, Congo.

2.657 (100), 2.607 (80), 3.304 (70), 3.722 (50), 3.354 (40), 1.861 (40), 4.380 (30)

<b>Chemistry:</b>	(1)	(2)	(3)		(1)	(2)	(3)
SiO <sub>2</sub>	49.78	50.20	50.86	Na <sub>2</sub> O	16.14	20.53	17.49
TiO <sub>2</sub>	0.32	0.23		K <sub>2</sub> O	1.18	0.27	
ZrO <sub>2</sub>	0.44			F	1.87		
Al <sub>2</sub> O <sub>3</sub>	2.45	0.05		Cl	0.30	0.02	
Fe <sub>2</sub> O <sub>3</sub>	1.86			H <sub>2</sub> O <sup>+</sup>	1.39		
FeO	0.54	0.35		H <sub>2</sub> O <sup>-</sup>	0.42		
MnO	0.58	0.17		CO <sub>2</sub>	0.00		
MgO	0.41	0.17		P <sub>2</sub> O <sub>5</sub>	0.02	0.00	
CaO	22.68	27.28	31.65	SO <sub>3</sub>	0.19		
SrO	0.00			S		0.02	
BaO	0.09			-O = (F, Cl) <sub>2</sub>	0.86		
				<b>Total</b>	<b>99.80</b>	<b>99.29</b>	<b>100.00</b>

(1) Mt. Shaheru, Congo. (2) Oldoinyo Lengai volcano, Tanzania; by electron microprobe.

(3) Na<sub>2</sub>Ca<sub>2</sub>Si<sub>3</sub>O<sub>9</sub>.

**Occurrence:** In nephelinite (Mt. Shaheru, Congo); in nephelinite and ash ejecta (Oldoinyo Lengai volcano, Tanzania).

**Association:** Götzenite (Mt. Shaheru, Congo); wollastonite, clinopyroxene, nepheline, melilite, titanian garnet, titanian magnetite (Oldoinyo Lengai, Tanzania).

**Distribution:** On Mt. Shaheru, the extinct southern cone of Mt. Nyiragongo, Kivu Province, Congo (Zaire). From the Oldoinyo Lengai volcano, Tanzania.

**Name:** To honor Arthur Delmar Combe, Geological Survey of Uganda.

**Type Material:** Royal Museum of Central Africa, Tervuren, Belgium, RGM8037; National Museum of Natural History, Washington, D.C., USA, 142981; The Natural History Museum, London, England, 1957,705.

**References:** (1) Sahama, T.G. and K. Hytönen (1957) Götzenite and combeite, two new silicates from the Belgian Congo. *Mineral. Mag.*, 31, 503–510. (2) (1958) *Amer. Mineral.*, 43, 791 (abs. ref. 1). (3) Fischer, R.X. and E. Tillmanns (1987) Revised data for combeite, Na<sub>2</sub>Ca<sub>2</sub>Si<sub>3</sub>O<sub>9</sub>. *Acta Cryst.*, C43, 1852–1854. (4) Dawson, J.B., J.V. Smith, and I.M. Steele (1989) Combeite (Na<sub>2.33</sub>Ca<sub>1.74</sub>others<sub>0.12</sub>)Si<sub>3</sub>O<sub>9</sub> from Oldoinyo Lengai, Tanzania. *J. Geol.*, 97, 365–372.