Erionite $(K_2, Ca, Na_2)_2Al_4Si_{14}O_{36}\cdot 15H_2O$

Crystal Data: Hexagonal. *Point Group:* $6/m\ 2/m\ 2/m$. Crystals prismatic, to 15 mm; in radiating groups or overgrowing offretite or levyne; typically fibrous, wool-like.

Physical Properties: *Cleavage:* Poor prismatic. *Fracture:* Splintery. Hardness = 3.5–4
D(meas.) = 2.08 D(calc.) = 2.13

Optical Properties: Transparent to translucent. *Color:* White; colorless in thin section.
Streak: White. *Luster:* Vitreous to silky.
Optical Class: Uniaxial (+). $\omega = 1.458$–1.480 $\epsilon = 1.458$–1.468

Cell Data: *Space Group:* $P6_3/mmc$. $a = 13.21$–13.26 $c = 15.04$–15.12 Z = 2

X-ray Powder Pattern: Tecopa, California, USA; close to offretite.
11.41 (100), 6.61 (73), 4.322 (67), 3.746 (65), 2.860 (60), 2.812 (52), 2.839 (50)

Chemistry:

	(1)	(2)		(1)	(2)
SiO_2	57.40	60.67	Na_2O	1.45	4.39
Al_2O_3	15.60	12.90	K_2O	3.40	4.09
Fe_2O_3		1.35	H_2O^+		7.69
FeO		0.09	H_2O^-		6.94
MgO	1.11	1.09	H_2O	17.58	
CaO	2.92	0.65	rem.		0.14
			Total	99.46	100.00

(1) Durkee, Oregon, USA; corresponds to $(Ca_{0.75}K_{0.52}Mg_{0.40}Na_{0.34})_{\Sigma=2.01}Al_{4.40}Si_{14.10}O_{36}\cdot 14.00H_2O$. (2) Tecopa, California, USA; remainder is TiO_2 0.09%, MnO 0.03%, P_2O_5 0.02%; corresponds to $(Na_{0.99}K_{0.60}Mg_{0.38}Ca_{0.16})_{\Sigma=2.13}Fe_{0.25}Al_{3.54}Si_{13.71}O_{36}\cdot 11.34H_2O$.

Mineral Group: Zeolite group.

Occurrence: In basalts; in altered rhyolitic tuffs and lake-bed sediments formed by alteration of vitric ash fallen into the lakes.

Association: Zeolites, "opal," quartz, celadonite, montmorillonite, dolomite, calcite.

Distribution: Some localities for relatively pure material are: in the USA, at Tecopa, Inyo Co., California; in Nevada, at Pine Valley, Eureka Co., Eastgate, Churchill Co., Jersey Valley, Pershing Co., and Reese River, Lander Co.; in Oregon, at Cape Lookout, Tillamook Co., Agate Beach, Lincoln Co., and Durkee, Baker Co. From the Parkgate quarry, Templepatrick, Co. Antrim, Ireland. At Hvalstod and in the Berufjord area, Iceland. At Moeraki, Otago, South Island, New Zealand. From Mazé, Niigata Prefecture, Japan. Many other localities are known.

Name: For the Greek word for *wool*, recalling its common appearance.

Type Material: Harvard University, Cambridge, Massachusetts, 86532; National Museum of Natural History, Washington, D.C., USA, R4066, 133333.

References: (1) Dana, E.S. (1899) Dana's system of mineralogy, (6th edition), app. I, 25. (2) Staples, L.W. and J.A. Gard (1959) The fibrous zeolite erionite; its occurrence, unit cell, and structure. Mineral. Mag., 32, 261–281. (3) Sheppard, R.A. and A.J. Gude, 3d (1969) Chemical composition and physical properties of the related zeolites offretite and erionite. Amer. Mineral., 54, 875–886. (4) Gard, J.A. and J.M. Tait (1971) Refinement of the crystal structure of erionite. In: Molecular sieves, Leuven Univ. Press, 94. (5) Wise, W.S. and R.W. Tschernich (1976) The chemical composition and origin of the zeolites offretite, erionite, and levyne. Amer. Mineral., 61, 853–863.