Levyne $(Ca, Na_2, K_2)Al_2Si_4O_{12}\cdot 6H_2O$

Crystal Data: Hexagonal. *Point Group:* $\bar{3}\ 2/m$. Crystals are thin tabular $\perp$ {0001}, with faces typically striated and {0001} rounded, to 3 cm; in sheaflike or confused aggregates. *Twinning:* Penetration twins on {0001} ubiquitous.

Physical Properties: *Cleavage:* $\{10\bar{1}1\}$, indistinct. *Fracture:* Subconchoidal to uneven. *Tenacity:* Brittle. Hardness = 4–4.5 D(meas.) = 2.09–2.16 D(calc.) = 2.121

Optical Properties: Transparent to translucent. *Color:* Colorless, white; stained grayish, greenish, reddish, yellowish by impurities; colorless in thin section. *Streak:* White. *Luster:* Vitreous.
Optical Class: Uniaxial (–); may be biaxial (–). ω = 1.496–1.505 ϵ = 1.491–1.500

Cell Data: *Space Group:* $R\bar{3}m$. a = 13.338(4) c = 23.014(9) Z = 3

X-ray Powder Pattern: Beech Creek, Oregon, USA.
4.084 (100), 2.805 (60), 6.69 (24), 8.15 (20), 3.854 (18), 3.156 (17), 3.338 (16)

Chemistry:

	(1)	(2)	(3)
SiO_2	46.76	43.88	49.76
Al_2O_3	21.91	22.73	19.09
CaO	11.12	10.57	8.88
Na_2O	1.34	2.01	1.71
K_2O	0.21	0.80	1.05
H_2O^+		14.87	
H_2O^-		5.67	
H_2O	18.65		19.51
Total	99.99	100.53	100.00

(1) Table Mountain, Colorado, USA. (2) Kuniga, Oki Islands, Japan; corresponds to $(Ca_{0.96}Na_{0.33}K_{0.09})_{\Sigma=1.38}Al_{2.27}Si_{3.72}O_{12}\cdot 5.8H_2O$. (3) Near Montresta, Sardinia, Italy; by electron microprobe, H_2O by TGA; corresponding to $(Ca_{0.79}Na_{0.27}K_{0.11})_{\Sigma=1.17}Al_{1.86}Si_{4.12}O_{12}\cdot 5.38H_2O$.

Mineral Group: Zeolite group.

Occurrence: Typically as a crystalline lining in cavities in basalts.

Association: Zeolites, especially offretite and erionite.

Distribution: Numerous localities, even for fine specimens. From near Dalsnipa, on Sandoy; Rossafelli and Nesvik, on Streymoy; and elsewhere on the Faeroe Islands. In Iceland, many localities, as at Mjöadalsá Canyon; Onundarfjord; Dyrafjord; around Berufjord, etc. In the USA, at Table Mountain, Jefferson Co., Colorado; from Spray, Wheeler Co., Beech Creek, Grant Co., and Goble, Colombia Co., Oregon. In Ireland, from Dungiven, Magilligan, and elsewhere in Co. Londonderry; and on Island Magee and in the Parkgate quarry, Templepatrick, Co. Antrim. From Cinchwad, Poona district, Maharashtra, India. Found at Flinders and on Victoria Island, Victoria, Australia.

Name: After Armand Lévy (1794–1841), French mineralogist and crystallographer.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 595.
(2) Sheppard, R.A., A.J. Gude 3d, G.A. Desborough, and J.S. White, Jr. (1974) Levyne-offretite intergrowths from basalt near Beech Creek, Grant County, Oregon. Amer. Mineral., 59, 837–842. (3) Passaglia, E. and E. Galli (1974) Levynes and erionites from Sardinia, Italy. Contr. Mineral. Petrol., 43, 253–259. (4) Merlino, S., E. Galli, and A. Alberti (1975) The crystal structure of levyne. Tschermaks Mineral. Petrog. Mitt., 22, 117–129. (5) Wise, W.S. and R.W. Tschernich (1976) The chemical compositions and origin of the zeolites offretite, erionite, and levyne. Amer. Mineral., 61, 853–863.