Iraqite-(La) $K(Ca,Na)_4(La,Ce,Th)_2(Si,Al)_{16}O_{40}$

Crystal Data: Tetragonal. *Point Group:* $4/m\ 2/m\ 2/m$. Anhedral, massive.

Physical Properties: *Cleavage:* Three orthogonal, two good and one poor. *Fracture:* Uneven. Hardness = 4.5 VHN = 245–314 D(meas.) = [3.27] (slightly corrected for impurities). D(calc.) = 3.28

Optical Properties: Semitransparent. *Color:* Pale greenish yellow; in thin section, colorless. *Streak:* Whitish. *Luster:* Dull to pearly.
Optical Class: Uniaxial (–); anomalously biaxial. *Orientation:* Extinction angles to 7°.
$\omega = 1.590$ $\epsilon = 1.585$

Cell Data: *Space Group:* $[P4/mcc]$ (by analogy to ekanite). $a = 7.61(1)$ $c = 14.72(2)$ Z = 1

X-ray Powder Pattern: Shakhi-Rash Mountain, Iraq.
5.28 (100), 3.31 (100), 2.64 (100), 7.36 (80), 3.38 (80), 3.40 (60), 2.17 (40)

Chemistry:

	(1)		(1)
SiO_2	51.7	CaO	12.00
ZrO_2	0.17	Na_2O	0.27
ThO_2	9.54	K_2O	2.76
UO_2	0.65	F	0.07
Al_2O_3	0.77	H_2O^+	3.51
RE_2O_3	15.06	H_2O^-	0.90
Fe_2O_3	0.22	CO_2	1.00
CuO	0.07	P_2O_5	0.01
PbO	0.35	S	0.14
MgO	0.02	$-O = F_2$	0.03
		Total	99.18

(1) Shakhi-Rash Mountain, Iraq; Zr, Th, RE by XRF, U by delayed neutron activation; $RE_2O_3 = La_2O_3$ 6.78%, Ce_2O_3 6.44%, Pr_2O_3 0.44%, Nd_2O_3 0.88%, Sm_2O_3 0.17%, Gd_2O_3 0.10%, Yt_2O_3 [*sic*] 0.25%; after deduction of calcite 2.27% and pyrite 0.26%, corresponds to $K_{1.07}[Ca_{3.49}(La,Ce)_{0.35}Na_{0.16}]_{\Sigma=4.00}[(La,Ce)_{1.33}Th_{0.66}]_{\Sigma=1.99}(Si_{15.69}Al_{0.27})_{\Sigma=15.96}(O_{39.93}F_{0.07})_{\Sigma=40.00}$.

Occurrence: In granite in contact with dolomitic marble containing olivine and diopside.

Association: n.d.

Distribution: At Shakhi-Rash Mountain, Hero Town, Qala-Diza, Iraq.

Name: For the country of origin, *Iraq*, and *lanthanum* in the composition.

Type Material: The Natural History Museum, London, England, 1973,481; National School of Mines, Paris, France.

References: (1) Livingstone, A., D. Atkin, D. Hutchison, and H.M. Al-Hermezi (1976) Iraqite, a new rare-earth mineral of the ekanite group. Mineral. Mag., 40, 441–445. (2) (1976) Amer. Mineral., 61, 1054 (abs. ref. 1).