Lanthanite-(Nd) $(Nd,La)_2(CO_3)_3 \cdot 8H_2O$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Platy crystals, flattened on {010}, showing {001}, {010}, {100}, {101}, {121}, to 3 mm; commonly a powdery crust. *Twinning:* On {101}, common, twin and composition plane.

Physical Properties: *Cleavage:* Perfect on {010}; very good on {101}. *Fracture:* Uneven. *Tenacity:* [Sectile.] [by analogy to lanthanite-(Ce) and lanthanite-(Nd).] Hardness = 2.5–3 D(meas.) = 2.78–2.84 D(calc.) = 2.816

Optical Properties: Semitransparent *Color:* Bright pink, violet; colorless in transmitted light. *Streak:* White. *Luster:* Vitreous to pearly.
Optical Class: Biaxial (–). *Orientation:* $X = b$; $Y = c$; $Z = a$. *Dispersion:* $r < v$, weak. $\alpha = 1.529$–1.532 $\beta = 1.590$–1.595 $\gamma = 1.614$–1.617 2V(meas.) = 58°–61° 2V(calc.) = 60°–63.5°

Cell Data: *Space Group: Pbnb.* $a = 9.476(4)$ $b = 16.940(8)$ $c = 8.942(4)$ Z = 4

X-ray Powder Pattern: Curitiba, Brazil; almost identical to lanthanite-(La).
8.50 (100), 3.252 (63), 3.038 (58), 4.473 (56), 4.741 (52), 4.139 (34), 3.953 (32)

Chemistry:

	(1)	(2)		(1)	(2)
CO_2	22.15	21.43	Eu_2O_3	1.64	0.37
ThO_2	0.03		Gd_2O_3	1.69	2.20
Y_2O_3	0.22	0.94	Tb_2O_3		0.13
La_2O_3	19.44	22.28	Dy_2O_3	0.44	0.58
Ce_2O_3	0.03	0.29	Ho_2O_3		0.33
Pr_2O_3	5.18	3.89	Er_2O_3		0.20
Nd_2O_3	21.84	22.77	Yb_2O_3		< 0.02
Sm_2O_3	4.10	3.57	H_2O	22.75	21.00
			Total	99.51	

(1) Curitiba, Brazil; H_2O by the Penfield method; corresponds to $(Nd_{0.79}La_{0.73}Pr_{0.19}Sm_{0.14}Gd_{0.06}Eu_{0.06}Dy_{0.01}Y_{0.01})_{\Sigma=1.99}(CO_3)_3 \cdot 8H_2O$. (2) Santa Isabel, Brazil; by X-ray fluorescence spectrometry, Eu by polarography, CO_2 and H_2O by elemental analyzer.

Occurrence: A rare secondary mineral typically formed by alteration or weathering from earlier rare-earth-element-bearing minerals.

Association: n.d.

Distribution: In Brazil, from Curitiba, Paraná, at Santa Isabel, São Paulo, and near Morro do Ferro, Minas Gerais. At Kirigo and Niikoba, Saga Prefecture, Japan. From Pavlovsk, Primorskiy Kray, Russia. At South Mountain, Bethlehem, Lehigh Co., Pennsylvania, USA.

Name: For *lanthanum* in its composition, and preponderance of *neodymium* over other rare-earth elements.

Type Material: Pierre and Marie Curie University, Paris, France; Canadian Geological Survey, Ottawa, Canada, 12213; National Museum of Natural History, Washington, D.C., USA, 147003.

References: (1) Roberts, A.C., G.Y. Chao, and F. Cesbron (1980) Lanthanite-(Nd), a new mineral from Curitiba, Paraná, Brazil. Geol. Surv. Canada, Paper 80-1C, 141–142. (2) (1981) Amer. Mineral., 66, 637–638 (abs. ref. 1). (3) Dal Negro, A., G. Rossi, and V. Tazzoli (1977) The crystal structure of lanthanite. Amer. Mineral., 62, 142–146.