LANTHANITE-(Nd), A NEW MINERAL FROM CURITIBA, PARANÁ, BRAZIL

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Lanthanite-(Nd) is the neodymium-predominant member of the lanthanite group of rare-earth carbonate minerals, having the general formula $(RE)_2(CO_3)_3 \cdot 8H_2O$. The mineral name was assigned using the nomenclature for rare-earth minerals proposed by Levinson (1966). Both the mineral and its name were approved by the Commission on New Minerals and Mineral Names, I.M.A. Type material is presently preserved in the National Mineral Collection, Geological Survey of Canada, Ottawa, and in the Mineralogical Collection of the P. and M. Curie University, Paris.

Lanthanite-(Nd) occurs near Curitiba, Paraná, Brazil, as bright pink platy crystals in recent carbonate-rich sediments. Detailed data on occurrence, locality, and paragenesis are reported in Coutinho (1955) and in Cesbron et al. (1979). Mineralogical data have been reported previously by Coutinho (1955), Ansell et al. (1976) and Cesbron et al. (1979). This note presents, in tabular form, a compilation of pertinent mineralogical data obtained to date on lanthanite-(Nd); data not previously published are marked with an asterisk. We are extremely grateful to Carlos do Prado Barbosa, who provided nearly all the lanthanite-(Nd) which was examined by Roberts, Ansell, Pringle, and Chao, and to the Société Rhône-Poulenc for the rare-earth analysis.

Table 1

Crystallographic Data for Lanthanite-(Nd)

Crystal System	Orthorhombic mmm
a	9.476 (4) Å
b	16.940 (8) Å
c	8.942 (4) Å
*a:b:c	0.5594 : 1 : 0.5279
Space Group	Pbnb (56)
Cell Volume	1435.4 Å^3
Z	4
G (meas.)	2.81 (3) (by Berman balance)
*G (calc.)	2.816 for analytical formula

Table 2

Chemical Data for Lanthanite-(Nd)

	wt.%[1]	
Nd_2O_3	21.84	
La_2O_3	19.44	
Pr_2O_3	5.18	
Sm_2O_3	4.10	Analytical Formula:
Gd_2O_3	1.69	$(Nd_{0.397}La_{0.365}Pr_{0.096}Sm_{0.072}Gd_{0.029}$
Eu_2O_3	1.64	$Eu_{0.028}Dy_{0.007}Y_{0.006})_2(CO_3)_3 \cdot 8H_2O$
Dy_2O_3	0.44	Theoretical Formula:
Y_2O_3	0.22	$(Nd,La)_2(CO_3)_3 \cdot 8H_2O$
Ce_2O_3	0.03	with Nd>La
ThO_2	0.03	*Chemical Refractive Energy[2]
CO_2	22.15	= 0.2004 for analytical formula
H_2O	22.75	
Total	99.51	

[1] Relative proportions of rare earths determined by wet assay, total percentage of rare earths determined on 39 mg handpicked crystals; separate handpicked sample used to determine H_2O (by Penfield method) and CO_2.

[2] Constants from Mandarino (1976).

Table 3

Physical and Morphological Properties of Lanthanite-(Nd)

Occurrence:	as veneers of bright pink micaceous crystals in calcareous sandy clay sediments of the Curitiba formation of recent age (for more information see Cesbron et al., 1979).
Opacity:	transparent, but turns a dull milky white on exposure to the elements
Lustre:	vitreous to pearly
*Streak:	white
Hardness:	between 2.5 and 3
*Fluorescence:	nonfluorescent in both long- and short-wave ultraviolet light
Chemical Tests:	vigorous effervescence in dilute HCl
Morphological Characteristics:	well formed orthorhombic crystals are rare and do not exceed 2 mm in length; flattened on [010]; cleavage {010} perfect, {101} very good; forms present are {001}, {010}, {100}, {101}, {122} and {121}; (010) often shows striations due to twinning on [101]

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Table 4

X-ray Powder Data for Lanthanite-(Nd)

I/I_o	dÅ obs.	dÅ calc.	hkl	I/I_o	dÅ obs.	dÅ calc.	hkl
100	8.50	8.47	020	12	2.440	2.438	043
52	4.741	4.739	200	13	2.424	2.425	260
56	4.473	4.471	002	8	2.388	2.387	062
28	4.233	4.235	040	9	2.368	2.369	400
34	4.139	4.135	220	21	2.282	2.282	420
32	3.953	3.954	022	10	2.234	2.235	004
7	3.868	3.867	140	7	2.202	2.203	342
7	3.829	3.827	041	26	2.167	2.168	303
63	3.252	3.252	202			2.168	243
7	3.160	3.157	240	6	2.161	2.161	024
10	3.075	3.074	042	9	2.132	2.132	262
58	3.038	3.035	222	6	2.107	2.107	124
14	3.004	3.004	151	27	2.093	2.093	402
7	2.980	2.978	301	13	2.068	2.067	440
		2.977	241	9	2.050	2.053	352
7	2.926	2.925	142	29	2.032	2.032	422
7	2.846	2.843	103	18	2.022	2.023	253
12	2.823	2.824	060	16	2.013	2.014	441
9	2.810	2.810	321	11	1.978	1.977	044
12	2.707	2.706	160	19	1.966	1.967	224
15	2.691	2.692	061	6	1.936	1.935	144
6	2.638	2.635	331	23	1.876	1.876	442
30	2.579	2.579	242	12	1.825	1.826	353
6	2.551	2.550	312	8	1.812	1.812	423
6	2.531	2.532	340				

Guinier-de Wolff Nonius camera (Cu Kα, radiation), quartz added as an internal standard; indexed with a = 9.476Å, b = 16.940Å, c = 8.942Å.

Table 5

Optical Properties* of Lanthanite-(Nd)

Colour in transmitted light	colourless
Character	biaxial
Sign	negative
α	1.532(1)
β	1.590(1)
γ	1.614(1)
2V meas.	61°
2V calc.	63.5°
X	=b
Y	=c
Z	=a
Physical Refractive Energy(Kp)	0.2059 for G. (meas.)
1-(Kp/Kc)	0.0274[1]

Optical properties determined on two different crystals (previously oriented on a precession camera) using a spindle stage and a sodium vapour lamp as an illuminator, immersion liquids checked immediately after a match with an Abbé refractometer

[1] Classification of Mandarino (1979) indicates excellent compatability.

Table 6

Thermal Behaviour of Lanthanite-(Nd)

TGA/DTG maxima (heating rate 300°C/hour)	DTA maxima (heating rate 600°C/hour)	Interpreted Reaction
90°C	119°C	continuous loss of eight H_2O molecules
483°C	500°C	loss of two CO_2 molecules
677°C	766°C	loss of one CO_2 molecule

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