

Lanthanite-(Ce)**(Ce, La, Nd)₂(CO₃)₃•8H₂O**

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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Crystals are platy, flattened on {010}, with a rhombic outline, to 5 mm; commonly as a powdery crust. *Twinning:* On {101}, twin and composition plane.

Physical Properties: *Cleavage:* {010}, perfect, micaceous. *Tenacity:* Sectile. Hardness = ~2.5 D(meas.) = 2.76 D(calc.) = 2.79

Optical Properties: Transparent. *Color:* Colorless, white, pink, yellow. *Streak:* White. *Luster:* Vitreous to pearly.

Optical Class: Biaxial (-). *Orientation:* $X = b$; $Y = c$; $Z = a$. *Dispersion:* $r < v$, weak. $\alpha = 1.532(2)$ $\beta = 1.594(2)$ $\gamma = 1.616(2)$ $2V(\text{meas.}) = 60(2)^\circ$ $2V(\text{calc.}) = 62^\circ$

Cell Data: *Space Group:* $Pbn\bar{b}$. $a = 9.482(6)$ $b = 16.938(11)$ $c = 8.965(3)$ $Z = 4$

X-ray Powder Pattern: Britannia mine, Wales; close to lanthanite-(La) and lanthanite-(Nd).

8.47 (100), 3.255 (73), 4.746 (65), 3.028 (65), 4.462 (62), 4.125 (40), 3.943 (38)

Chemistry:

	(1)		(1)
CO ₂	21.0	Sm ₂ O ₃	2.50
Y ₂ O ₃	0.74	Gd ₂ O ₃	1.53
La ₂ O ₃	14.44	H ₂ O	23.0
Ce ₂ O ₃	20.61	Total	98.6
Nd ₂ O ₃	14.78		

(1) Britannia mine, Wales; by electron microprobe, average of five analyses, CO₂ by CHN analyzer, H₂O by TGA, O²⁻ calculated for charge balance; corresponds to (Ce_{0.78}La_{0.55}Nd_{0.55}Sm_{0.09}Gd_{0.05}Y_{0.04})_{Σ=2.06}C_{2.97}O_{9.03}•7.96H₂O.

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

Association: Allanite-(Ce), cerite-(Ce).

Distribution: From the Britannia mine, Snowdonia, Gwynedd, Wales. In Sweden, from the Bastnäs mine, near Riddarhyttan, Västmanland. At the Vuoriyarvi carbonatite massif, Kola Peninsula, Russia. In China, from Bayan Obo, Chengde and Chicheng, Hebei Province. The following lanthanite occurrences are listed here, but require a full analysis to establish the dominant rare-earth element. In the USA, from the Sanford mine, Moriah, Essex Co., New York; at the Medford quarry, 50 km west of Baltimore, Carroll Co., Maryland; from the Baringer Hill pegmatite, 26 km west of Burnet, Llano Co., Texas. from vermiculite prospects at the head of Big Sandy Creek, Rocky Boy's Indian Reservation, about 40 km east of Box Elder, Hill Co., Montana; At Mont Saint-Hilaire, Quebec, Canada. In the Qaqarsuk carbonatite, near Sukkertoppen, Greenland.

Name: For its relation to *lanthanite*-(La), and preponderance of *cerium* over other rare-earth elements.

Type Material: National Museum, Cardiff, Wales, 84.6G.M1; The Natural History Museum, London, England, 1984.614; National Museum of Natural History, Washington, D.C., USA, 162169.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 241–243. (2) Bevins, R.E., G. Rowbotham, F.S. Stevens, S.A. Turgoose, and P.A. Williams (1985) Lanthanite-(Ce), (Ce, La, Nd)₂(CO₃)₃•8H₂O, a new mineral from Wales, U.K. *Amer. Mineral.*, 70, 411–413. (3) Atencio, D., R.E. Bevins, M. Fleischer, C.T. Williams, and P.A. Williams (1989) Revision of the lanthanite group and new data for specimens from Bastnäs, Sweden and Bethlehem, USA. *Mineral. Mag.*, 53, 639–642. (4) Dal Negro, A., G. Rossi, and V. Tazzoli (1977) The crystal structure of lanthanite. *Amer. Mineral.*, 62, 142–146.

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