

**Kozoite-(La)****La(CO<sub>3</sub>)(OH)**

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**Crystal Data:** Orthorhombic. *Point Group:*  $2/m\ 2/m\ 2/m$ . As rhombic dipyramidal crystals, to 10  $\mu\text{m}$ , in aggregates.

**Physical Properties:** Hardness = n.d.  $D(\text{meas.}) = \text{n.d.}$   $D(\text{calc.}) = 4.77$

**Optical Properties:** Semitransparent. *Color:* Pale pinkish purple to white. *Luster:* Vitreous to dull.

*Optical Class:* Biaxial (-) [by analogy to ancylite-(Ce)].  $\alpha = 1.698(2)$   $\beta = \text{n.d.}$   $\gamma = 1.780(5)$   
 $2V(\text{meas.}) = \text{n.d.}$

**Cell Data:** *Space Group:*  $[Pmcn]$  [by analogy to ancylite-(Ce)].  $a = 4.9829(1)$   
 $b = 8.5188(2)$   $c = 7.2570(2)$   $Z = 4$

**X-ray Powder Pattern:** Niikoba, Japan.

4.29 (100), 2.93 (89), 2.333 (78), 2.060 (78), 1.994 (75), 3.69 (72), 2.640 (59)

**Chemistry:**

	(1)		(1)
CO <sub>2</sub>	21.10	Eu <sub>2</sub> O <sub>3</sub>	1.84
Y <sub>2</sub> O <sub>3</sub>	0.70	Gd <sub>2</sub> O <sub>3</sub>	2.99
La <sub>2</sub> O <sub>3</sub>	21.39	Tb <sub>2</sub> O <sub>3</sub>	0.11
Ce <sub>2</sub> O <sub>3</sub>	0.26	Dy <sub>2</sub> O <sub>3</sub>	0.24
Pr <sub>2</sub> O <sub>3</sub>	6.25	CaO	0.49
Nd <sub>2</sub> O <sub>3</sub>	30.66	H <sub>2</sub> O	5.44
Sm <sub>2</sub> O <sub>3</sub>	5.39	<u>Total</u>	<u>96.86</u>

(1) Niikoba, Japan; by electron microprobe, average of six analyses, C and H by CHN analyzer, average of three analyses, (CO<sub>3</sub>)<sup>2-</sup> and (OH)<sup>1-</sup> confirmed by IR; corresponds to (Nd<sub>0.42</sub>La<sub>0.30</sub>Pr<sub>0.09</sub>Sm<sub>0.07</sub>Gd<sub>0.04</sub>Eu<sub>0.02</sub>Ca<sub>0.02</sub>Y<sub>0.02</sub>) $\Sigma=0.98$ (CO<sub>3</sub>)<sub>1.12</sub>[(OH)<sub>0.68</sub>(H<sub>2</sub>O)<sub>0.23</sub>] $\Sigma=0.91$ .

**Polymorphism & Series:** Dimorphous with hydroxylbastnäsite-(Nd).

**Occurrence:** A rare secondary mineral in fractures in alkali olivine basalt, probably of hydrothermal origin.

**Association:** Lanthanite-(Nd), kimuraite-(Nd).

**Distribution:** From Niikoba, Saga Prefecture, Japan.

**Name:** To honor Kozo Nagashima (1925–1985), Japanese chemist, Tsukuba University, Tsukuba, Japan, pioneer in the study of rare-earth minerals in Japan.

**Type Material:** National Science Museum, Tokyo, Japan, M27940.

**References:** (1) Miyawaki, R., S. Matsubara, K. Yokoyama, K. Takeuchi, Y. Terada, and I. Nakai (2000) Kozoite-(Nd), Nd(CO<sub>3</sub>)(OH), a new mineral in an alkali olivine basalt from Hizen-cho, Saga Prefecture, Japan. *Amer. Mineral.*, 85, 1076–1081. (2) Dexpert, H. and P. Caro (1974) Détermination de la structure cristalline de la variété a des hydroxycarbonates de terres rare LnOHCO<sub>3</sub> (Ln=Nd). *Materials Research Bull.*, 9, 1577–1585 (in French with English abs.).