

Crystal Data: Cubic. *Point Group:* $2/m\bar{3}$. As equant crystals displaying {111} and {100}; epitaxially intergrown with DOH-type silicate clathrate. *Twining:* Spinel law.

Physical Properties: *Cleavage:* n.d. *Fracture:* n.d. *Tenacity:* n.d. Hardness = 5.5-7
D(meas.) = n.d. D(calc.) = 2.03(1)

Optical Properties: Transparent to translucent. *Color:* Colorless. *Streak:* n.d. *Luster:* n.d.
Optical Class: Isotropic. $n = 1.470(1)$ Anisotropic (uniaxial) domains observed in thin section.

Cell Data: *Space Group:* $Fd\bar{3}$. $a = 19.3742(3)$ $Z = 136$
Cubic and tetragonal domains are epitaxially intergrown and some of the tetragonal domains are most likely oriented with each other as pseudo-merohedral twins.

X-ray Powder Pattern: Arakawa, Minami-boso City, Chiba Prefecture, Japan.
3.276 (100), 3.730 (91), 5.847 (83), 5.596 (46), 3.426 (40), 6.858 (38), 3.956 (25)

Chemistry:

(1) Arakawa, Minami-boso City, Chiba Prefecture, Japan; electron microprobe analysis, supplemented by Raman spectroscopy; no analysis provided, excluding guest molecules corresponds to $\text{Na}_{0.99}(\text{Si}_{1.34.53}\text{Al}_{1.63})\text{O}_{272}$; CH_4 , C_2H_6 , C_3H_8 , and $i\text{-C}_4\text{H}_{10}$ molecules detected by Raman analysis ascribed to guest molecules in the structural cages.

Occurrence: As veins cutting tuffaceous sandstone and mudstone in forearc marine sediments deposited near the plate margin of the Paleo-Izu arc and the triple junction of the Pacific, Philippine Sea, and North America plates.

Association: DOH-type silicate clathrate, calcite, quartz, opal-A, pyrite, epistilbite, clinoptilolite.

Distribution: From the Hota Group or Emi Group marine sediments, Arakawa, Minami-boso City, Chiba Prefecture, Japan.

Name: For the *Chiba* Prefecture in Japan where the first samples were collected.

Type Material: Mineral Collection, Tohoku University Museum, Sendai, Japan (A-151).

References: (1) Momma, K., T. Ikeda, K. Nishikubo, N. Takahashi, C. Honma, M. Takada, Y. Furukawa, T. Nagase, and Y. Kudoh (2011) New silica clathrate minerals that are isostructural with natural gas hydrates. *Nature Communications*, 2, Article 196, 1-7. (2) (2012) *Amer. Mineral.*, 97, 2066 (abs. ref. 1).