**Szymańskiite** $(H_3O)_8^{1+}Hg_{16}^{1+}(Ni,Mg)_6(CO_3)_{12}(OH)_{12}\cdot 3H_2O$



**Crystal Data:** Hexagonal. *Point Group:* 6. As sprays of euhedral to subhedral prismatic crystals, elongated along [0001], with dominant $\{10\overline{1}0\}$ striated ‖ [0001], and minor {0001}, to 0.4 mm.

**Physical Properties:** *Cleavage:* $\{10\overline{1}0\}$, poor. *Fracture:* Irregular to conchoidal. *Tenacity:* Brittle. Hardness = n.d. D(meas.) = n.d. D(calc.) = 4.86 Slowly darkens on exposure to light.

**Optical Properties:** Transparent. *Color:* Blue-gray to blue-green, darkening to black on exposure to air. *Streak:* Pale blue. *Luster:* Vitreous.
*Optical Class:* Uniaxial (–). *Pleochroism:* $O$ = yellowish green; $E$ = bluish green.
*Absorption:* $O < E$. $\omega = 1.795(3)$ $\epsilon = 1.786(3)$

**Cell Data:** *Space Group:* $P6_3$. $a = 17.3984(7)$ $c = 6.0078(4)$ $Z = 1$

**X-ray Powder Pattern:** Clear Creek claim, California, USA.
14.9 (100), 5.60 (100), 3.299 (80), 2.704 (60), 2.665 (60), 3.201 (50), 2.476 (50)

**Chemistry:**

| | (1) | (2) |
|---|---|---|
| NiO | 7.9 | 6.59 |
| $Hg_2O$ | 75.8 | 72.14 |
| MgO | 2.0 | 1.67 |
| $CO_2$ | | 11.42 |
| $H_2O$ | | 8.18 |
| Total | | 100.00 |

(1) Clear Creek claim, California; by electron microprobe, average of three analyses, values high due to volatilization; IR confirms presence of $CO_3^{2-}$, $(OH)^{1-}$, $H_2O$. (2) Do.; with $H_2O$ and $CO_2^{2-}$ determined by crystal-structure analysis, corresponds to $(H_3O)_8Hg_{16}(Ni_{4.08}Mg_{1.92})_{\Sigma=6.00}(CO_3)_{12}(OH)_{12}\cdot 3H_2O$.

**Occurrence:** A very rare secondary mineral in the oxidized zone of a mercury–nickel-bearing sulfide deposit in silicate–carbonate rock hydrothermally altered from serpentinite.

**Association:** Cinnabar, montroydite, mercury, edgarbaileyite, millerite, cinnabar, quartz.

**Distribution:** From the Clear Creek claim, near the Clear Creek mercury mine, New Idria district, San Benito Co., California, USA.

**Name:** Honors Dr. Jan T. Szymański (1938– ), X-ray crystallographer, Canadian Centre for Mineral and Energy Technology (CANMET), Ottawa, Canada.

**Type Material:** Canadian Geological Survey, Ottawa, Canada, 65743.

**References:** (1) Roberts, A.C., T.S. Ercit, R.C. Erd, and R.L. Oscarson (1990) Szymańskiite, $Hg_{16}^{1+}(Ni,Mg)_6(CO_3)_{12}(OH)_{12}(H_3O)_8^{1+}\cdot 3H_2O$, a new mineral species from the Clear Creek claim, San Benito County, California. Can. Mineral., 28, 703–707. (2) Szymanski, J.T. and A.C. Roberts (1990) The crystal structure of szymańskiite, a partly ordered $(Hg-Hg)^{2+}$, $(Ni,Mg)^{2+}$ hydronium-carbonate-hydroxide-hydrate. Can. Mineral., 28, 709–718. (3) (1991) Amer. Mineral., 76, 1731 (abs. refs. 1–2).