

**KCa₂[(Fe²⁺, Mg)₃
(Al, Fe³⁺)₂](Si₅Al₃)O₂₂(OH)₂**

Sadanagaite

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Crystal Data: Monoclinic. *Point Group:* *m*, 2, or 2/*m*. Prismatic crystals, to 1 mm; as polycrystalline aggregates.

Physical Properties: *Cleavage:* Perfect on {110}. *Tenacity:* [Brittle.] *Hardness* = ~6
D(meas.) = n.d. D(calc.) = 3.30

Optical Properties: Semitransparent. *Color:* Dark brown to black; in thin section, paler with greater silicon content. *Streak:* Very light brown. *Luster:* Vitreous.
Optical Class: Biaxial (+) or (-). *Pleochroism:* Strong; *X* = pale brown, grayish, or greenish yellow; *Y* = yellowish orange to light olive-brown; *Z* = greenish brown, light olive-brown to dark yellowish orange. *Orientation:* *Z* ∧ *c* = 28°. α = 1.673(2) β = 1.684(2) γ = 1.697(2)
2*V*(meas.) = 70°–90° 2*V*(calc.) = 86°

Cell Data: *Space Group:* *C*2, *Cm*, or *C*2/*m*. *a* = 9.922(10) *b* = 18.03(2) *c* = 5.352(9)
β = 105.30(10)° *Z* = 2

X-ray Powder Pattern: [Myojin Island, Japan; identical to magnesio-sadanagaite.]
3.28 (100), 8.48 (80), 3.15 (70), 2.707 (60), 2.162 (55), 2.951 (50), 2.766 (45)

Chemistry:	(1)	(2)		(1)	(2)
SiO ₂	29.9	34.4	MgO	6.1	6.11
TiO ₂	4.3	3.15	CaO	11.9	11.9
Al ₂ O ₃	22.6	18.4	Na ₂ O	0.6	0.73
FeO	17.4	18.4	K ₂ O	3.7	4.21
MnO	0.3	0.24			
			Total	96.8	97.5

(1) Yuge Island, Japan; by electron microprobe, Fe²⁺:Fe³⁺ calculated from stoichiometry; corresponds to (K_{0.74}Na_{0.17})_{Σ=0.91}Ca_{1.99}(Fe_{1.63}²⁺Mg_{1.41}Al_{0.81}Fe_{0.63}³⁺Ti_{0.50})_{Σ=4.98}(Si_{4.66}Al_{3.34})_{Σ=8.00}O₂₂(OH)₂. (2) Nogo-Hakusan area, Japan; by electron microprobe, Fe²⁺:Fe³⁺ calculated from stoichiometry; corresponds to (K_{0.84}Na_{0.22})_{Σ=1.06}Ca_{1.99}(Fe_{2.17}²⁺Mg_{1.42}Al_{0.74}Ti_{0.37}Fe_{0.23}³⁺Mn_{0.03})_{Σ=4.96}(Si_{5.36}Al_{2.64})_{Σ=8.00}O₂₂(OH)₂.

Polymorphism & Series: Forms a series with magnesio-sadanagaite.

Mineral Group: Amphibole (calcic) group: Mg/(Mg + Fe²⁺) 0.5; Fe³⁺/(Fe³⁺ + Al^{vi}) 0.50; (Na + K)_A ≥ 0.5; Na_B < 0.67; (Ca + Na)_B ≥ 1.34; Si < 5.5; Ti < 0.5.

Occurrence: By contact metamorphism, producing banded skarns, under amphibolite to pyroxene hornfels facies conditions; from eclogites.

Association: Vesuvianite, hercynite, sphene, ilmenite, apatite (Yuge Island, Japan); biotite, orthoclase, subsilicic ferroan pargasite (Nogo-Hakusan area, Japan).

Distribution: On Yuge Island, Ehime Prefecture, and in the Nogo-Hakusan area, Fukui Prefecture, Japan. At the Botallack mine, St. Just, Cornwall, England. In the Oetzal, Austria.

Name: To honor Professor Ryoichi Sadanaga of the Mineralogical Institute, University of Tokyo, Tokyo, Japan.

Type Material: University of Tokyo, Tokyo; National Science Museum, Tokyo, Japan, M23378.

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