

**Retzian-(Ce)****(Mn<sup>2+</sup>, Mg)<sub>2</sub>(Ce, Nd)(AsO<sub>4</sub>)(OH)<sub>4</sub>**

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**Crystal Data:** Orthorhombic. *Point Group:* 2/m 2/m 2/m. Crystals are elongated along [001], may be tabular on {010}, with large {010}, {001}, {101}, {110}, small {130}, to 0.5 mm, usually in parallel growths.

**Physical Properties:** *Fracture:* Conchoidal to uneven. Hardness = 4 D(meas.) = 4.15 D(calc.) = 4.45

**Optical Properties:** Subtranslucent. *Color:* Dark chocolate-brown to chestnut-brown; brown in transmitted light. *Streak:* Pale brown. *Luster:* Vitreous to greasy.

*Optical Class:* Biaxial (+). *Pleochroism:* X = colorless to yellow; Y = yellow to brown; Z = red-brown to crimson. *Orientation:* X = c; Y = b; Z = a. *Dispersion:* r < v, weak. *Absorption:* Z > Y > X. α = 1.777(5) β = 1.788(5) γ = 1.800(5) 2V(meas.) = Large. 2V(calc.) = 88°

**Cell Data:** *Space Group:* Pban. a = 5.670(3) b = 12.03(1) c = 4.863(4) Z = 2

**X-ray Powder Pattern:** Moss mine, Sweden; very similar to retzian-(La) and retzian-(Nd). 2.717 (10), 3.528 (8), 1.848 (5), 6.00 (4), 1.619 (4), 4.84 (3), 2.335 (3)

**Chemistry:**

	(1)		(1)
As <sub>2</sub> O <sub>5</sub>	27.1	Gd <sub>2</sub> O <sub>3</sub>	1.9
Y <sub>2</sub> O <sub>3</sub>	1.7	FeO	1.1
La <sub>2</sub> O <sub>3</sub>	3.0	MnO	27.3
Ce <sub>2</sub> O <sub>3</sub>	14.5	ZnO	0.8
Pr <sub>2</sub> O <sub>3</sub>	2.4	MgO	1.2
Nd <sub>2</sub> O <sub>3</sub>	6.8	CaO	0.6
Sm <sub>2</sub> O <sub>3</sub>	1.6	H <sub>2</sub> O	8.3
Eu <sub>2</sub> O <sub>3</sub>	1.0	<hr/>	
		Total	99.3

(1) Moss mine, Sweden; by electron microprobe, total Mn as MnO, H<sub>2</sub>O by DTA-TGA on a separate sample; corresponds to (Mn<sub>1.77</sub>Mg<sub>0.13</sub>Fe<sub>0.07</sub>Zn<sub>0.05</sub>Ca<sub>0.05</sub>)<sub>Σ=2.07</sub>(Ce<sub>0.40</sub>Nd<sub>0.19</sub>La<sub>0.08</sub>Y<sub>0.07</sub>Pr<sub>0.07</sub>Sm<sub>0.04</sub>Gd<sub>0.05</sub>Eu<sub>0.03</sub>)<sub>Σ=0.93</sub>(AsO<sub>4</sub>)<sub>1.08</sub>(OH)<sub>3.69</sub>.

**Occurrence:** A rare mineral in cavities in porous dolomite.

**Association:** Jacobsite, pyrochroite.

**Distribution:** From the Moss mine, near Nordmark, Värmland, Sweden.

**Name:** Honoring Professor Anders Johan Retzius (1742–1821), University of Lund, Lund, Sweden, Swedish naturalist, and for *cerium*, its dominant rare earth element.

**Type Material:** Swedish Museum of Natural History, Stockholm, Sweden; National Museum of Natural History, Washington, D.C., USA, 145882.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 794–795. (2) Moore, P.B. (1967) Crystal chemistry of the basic manganese arsenate minerals 1. The crystal structures of flinkite, Mn<sub>2</sub><sup>2+</sup>Mn<sup>3+</sup>(OH)<sub>4</sub>(AsO<sub>4</sub>) and retzian, Mn<sub>2</sub><sup>2+</sup>Y<sup>3+</sup>(OH)<sub>4</sub>(AsO<sub>4</sub>). *Amer. Mineral.*, 52, 1603–1613. (3) Moore, P.B. (1968) Contributions to Swedish mineralogy. I. Studies on the basic arsenates of manganese: retzian, hemafibrite, synadelphite, arsenoclasite, arseniopleite, and akrochordite. *Arkiv. Mineral. Geol.*, 4(5), 425–444. (4) Dunn, P.J. and B.D. Sturman (1982) Retzian-(Nd), a new mineral from Sterling Hill, New Jersey and a redefinition of retzian. *Amer. Mineral.*, 67, 841–845.