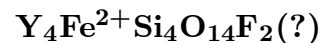


**Rowlandite-(Y)**

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**Crystal Data:** Triclinic; commonly metamict. *Point Group:* 1 or  $\bar{1}$ . As small irregular masses.

**Physical Properties:** Hardness = 5.5–6.5 D(meas.) = 4.39 when metamict; 4.55 when heated at 900 °C for one hour; 4.85 when crystalline. D(calc.) = [4.33]

**Optical Properties:** Transparent in thin fragments. *Color:* Pale dull green, grayish white; alters to brick-red material. *Luster:* Vitreous; waxy when altered.

*Optical Class:* Biaxial (+); isotropic when metamict.  $n = 1.704$ , metamict; 1.76 when heated at 900 °C for one hour.  $\alpha = 1.763$   $\beta = \text{n.d.}$   $\gamma = 1.769$   $2V(\text{meas.}) = \text{n.d.}$

**Cell Data:** *Space Group:*  $P1$  or  $P\bar{1}$ .  $a = 6.59$   $b = 8.65$   $c = 5.53$   $\alpha = 99^\circ 2'$   
 $\beta = 104^\circ 8'$   $\gamma = 91^\circ 28'$   $Z = 1$

**X-ray Powder Pattern:** Baringer Hill, Texas, USA; pattern from metamict material heated one hour in nitrogen at 900 °C; matches crystalline material.

3.06 (100), 4.87 (60), 3.51 (55), 3.59 (50), 2.076 (45), 1.720 (40), 2.608 (35)

**Chemistry:**

	(1)	(2)
SiO <sub>2</sub>	25.98	30.59
UO <sub>2</sub>	0.40	
Y <sub>2</sub> O <sub>3</sub>	61.91	57.47
FeO	4.69	9.14
CaO	0.19	
F		4.84
LOI	2.01	
–O = F <sub>2</sub>		2.04
Total		100.00

(1) Baringer Hill, Texas, USA; partial analysis. (2) Y<sub>4</sub>FeSi<sub>4</sub>O<sub>14</sub>F<sub>2</sub>.

**Occurrence:** In some rare-earth-rich pegmatites.

**Association:** Gadolinite, yttrialite (Baringer Hill, Texas, USA).

**Distribution:** In the Baringer Hill pegmatite, 26 km west of Burnet, Llano Co., and from Clear Creek, Burnet Co., Texas, USA. In the Evans-Lou quarry, near Wakefield Lake, Quebec, Canada. From an unspecified locality in Kazakhstan.

**Name:** For Henry Augustus Rowland (1848–1901), American physicist and spectroscopist, of Johns Hopkins University, Baltimore, Maryland, USA, student of the spectra of the rare earth elements, and for its *yttrium* content.

**Type Material:** Harvard University, Cambridge, Massachusetts, USA, 134649.

**References:** (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 1047.  
(2) Frondel, C. (1961) Two yttrium minerals: spencite and rowlandite. *Can. Mineral.*, 6, 576–581.  
(3) Shipovalov, Y.V. and A.V. Stepanov (1971) X-ray structural study of rowlandite. *Issled. Oblast. Khim. Fiz. Metod. Anal. Min. Syr'ya*, 189–192 (in Russian). (4) (1976) *Mineral. Abs.*, 27, 67 (abs. ref. 3).