Pseudorutile $Fe_2^{3+}Ti_3O_9$

Crystal Data: Hexagonal. *Point Group:* $6/m\ 2/m\ 2/m$. As thin, irregular plates having fibrous texture; fine-grained, massive, replacing ilmenite crystals and grains.

Physical Properties: *Fracture:* Subconchoidal. *Tenacity:* Brittle. Hardness = 5.5 D(meas.) = ∼3.8 D(calc.) = [4.82] Magnetic.

Optical Properties: Opaque, transparent when very thin. *Color:* Dark steel-gray on fresh fractures, light brown to black; deep red in transmitted light. *Streak:* Reddish brown. *Luster:* Submetallic to metallic.
Optical Class: Uniaxial; moderate birefringence. *Pleochroism:* Very weak; in reds. *Absorption:* $Z > X$. $n = \sim 2.62$

Cell Data: *Space Group:* $P6_322$. $a = 14.375(6)$ $c = 4.615(3)$ Z = [6]

X-ray Powder Pattern: South Neptune Island, South Australia.
1.6860 (100), 2.481 (80), 2.187 (70), 2.784 (20d), 3.897 (15d), 2.2993 (8), 1.6253 (6d)

Chemistry:

	(1)	(2)
TiO_2	58.84	60.01
Fe_2O_3	34.65	39.99
Mn_2O_3	0.60	
FeO	1.24	
H_2O^+	3.24	
Total	98.57	100.00

(1) South Neptune Island, South Australia; corresponds to $(Fe^{3+}_{1.81}Fe^{2+}_{0.07}Mn^{3+}_{0.03})_{\Sigma=1.91}$ $Ti_{3.08}O_9 \cdot 0.75H_2O$. (2) $Fe_2Ti_3O_9$.

Occurrence: An intermediate product of the weathering of ilmenite.

Association: Ilmenite, rutile, anatase, hematite, gadolinite.

Distribution: On South Neptune Island, South Australia. In the USA, around Lakehurst, Ocean Co., New Jersey. Other occurrences have been tentatively noted in ilmenite-rich beach sands.

Name: From the Greek for *false* and its relation to *rutile*.

Type Material: Museum Victoria, Melbourne, Australia, M42789.

References: (1) Teufer, G. and A.K. Temple (1966) Pseudorutile – a new mineral intermediate between ilmenite and rutile in the natural alteration of ilmenite. Nature, 211, 179–181. (2) Grey, I.E. and A.F. Reid (1975) The structure of pseudorutile and its role in the natural alteration of ilmenite. Amer. Mineral., 60, 898–906. (3) Grey, I.E., J.A. Watts, and P. Bayliss (1994) Mineralogical nomenclature: pseudorutile revalidated and neotype given. Mineral. Mag., 58, 597–600.