

**Crystal Data:** Amorphous. *Point Group:* n.d. As aggregates, to 9 cm, of submillimetric pseudocrystals after vivianite, and as pseudomorphs of vivianite.

**Physical Properties:** *Cleavage:* None, good parting along the {010} cleavage of the vivianite precursor. *Fracture:* n.d. *Tenacity:* Brittle. Hardness = n.d.  $D(\text{meas.}) = 2.42$   $D(\text{calc.}) = \text{n.d.}$

**Optical Properties:** Translucent. *Color:* Brown; amber in transmitted light. *Streak:* Amber. *Luster:* Vitreous to greasy. *Optical Class:* Isotropic.  $n = 1.695(5)$

**Cell Data:** *Space Group:* Amorphous.

**X-ray Powder Pattern:** X-ray amorphous.

Chemistry:	(1)	(2)
MgO	0.61	0.69
CaO	-	2.93
Mn <sub>2</sub> O <sub>3</sub>	2.23	-
Fe <sub>2</sub> O <sub>3</sub>	43.97	43.22
P <sub>2</sub> O <sub>5</sub>	29.48	28.60
<u>H<sub>2</sub>O</u>	<u>23.90</u>	<u>23.05</u>
Total	100.19	98.49

(1) Valdarno Superiore, Upper Arno River Valley, Tuscany, Italy; average of 30 electron microprobe analyses supplemented by FTIR and X-ray absorption spectroscopy (XANES and EXAFS), H<sub>2</sub>O by TGA and LOI, Fe<sup>3+</sup> confirmed by XANES; corresponds to  $(\text{Fe}_{2.64}\text{Mn}_{0.13}\text{Mg}_{0.07})_{\Sigma=2.84}(\text{PO}_4)_2(\text{OH})_{2.45} \cdot 5.1\text{H}_2\text{O}$ . (2) Wannan Falls, ~7 km west of Hamilton, Victoria, Australia; average of 12 electron microprobe analyses supplemented by FTIR and X-ray absorption spectroscopy (XANES and EXAFS), H<sub>2</sub>O by TGA and LOI, Fe<sup>3+</sup> confirmed by XANES; corresponds to  $(\text{Fe}_{2.69}\text{Ca}_{0.26}\text{Mg}_{0.08})_{\Sigma=3.03}(\text{PO}_4)_2(\text{OH})_{2.75} \cdot 5.0\text{H}_2\text{O}$ .

**Occurrence:** In cavities within concretionary nodules, in clays in a clastic rock sequence (Italy) and in clay underlying basalt (Australia). Formed in-situ by oxidation of Fe<sup>2+</sup> in vivianite, progressing through metavivianite to santabarbarait.

**Association:** Vivianite, metavivianite, clay.

**Distribution:** From Valdarno Superiore, Upper Arno River Valley, Tuscany, Italy and Wannan Falls, ~7 km west of Hamilton, Victoria, Australia.

**Name:** For the locality in the *Santa Barbara* mining district of Tuscany, Italy, and for the Christian martyr *Santa Barbara*, the patron saint of miners.

**Type Material:** Natural History Museum, University of Florence, Italy (2862/RI) and Museum Victoria, Australia (M22892 and M34637).

**References:** (1) Pratesi, G., C. Cipriani, G. Giuli, and W.D. Birch (2003) Santabarbarait: a new amorphous phosphate mineral. *Eur. J. Mineral.*, 15, 185-192. (2) (2003) *Amer. Mineral.*, 88, 1838 (abs. ref. 1).