

# The Diadochite problem

10 candidate diadochite specimens have been analyzed during past four years

**Diadochite** Chemistry is:  $\text{Fe}^{3+}_2(\text{PO}_4)(\text{SO}_4)(\text{OH}) \cdot 6\text{H}_2\text{O}$

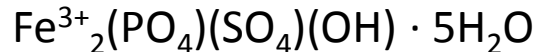
## Some background:

From *Rocks & Minerals*, Sept/Oct. 1981

“Phosphate Minerals of the Palermo  
Pegmatite”

By Segeler, et. al. Page 203

### “DIADOCHITE

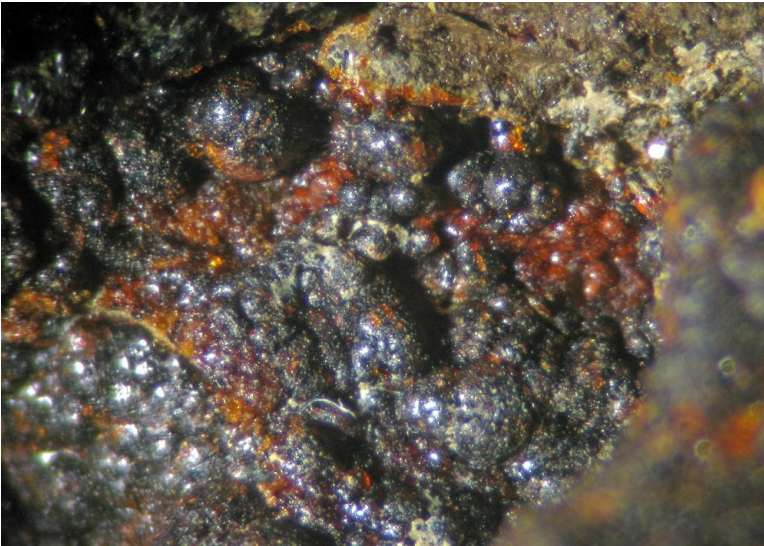


As globular masses resembling hardened red jelly. Locally common in oxidized assemblages coating minerals such as strunzite and other Fe, Mn phosphates.”

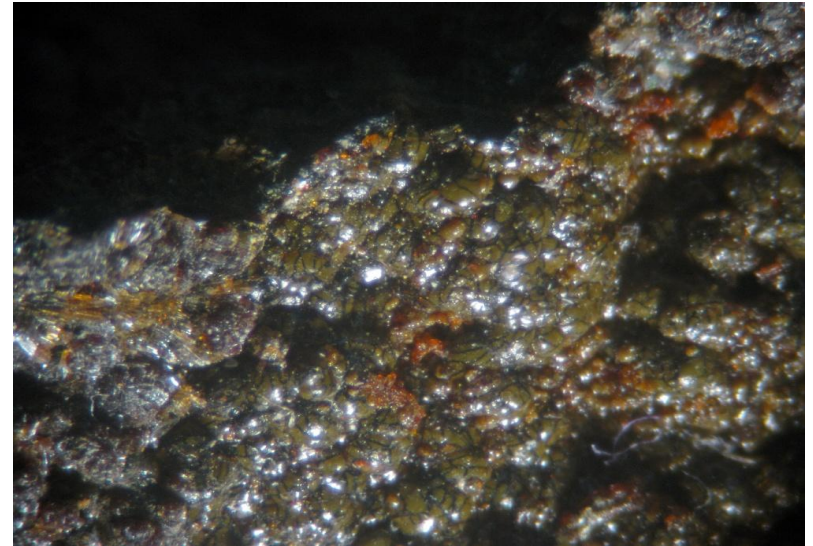
Diadochite illustration from  
*The Pegmatite Mines Known as Palermo*  
by Whitmore and Lawrence  
Frederick Wilda illustration  
(with permission)



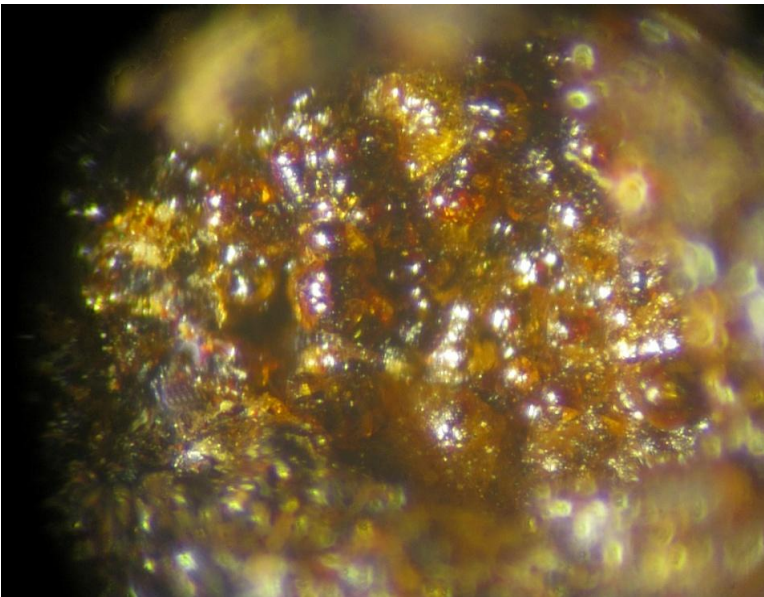
## Some candidate New Hampshire diadochite specimens



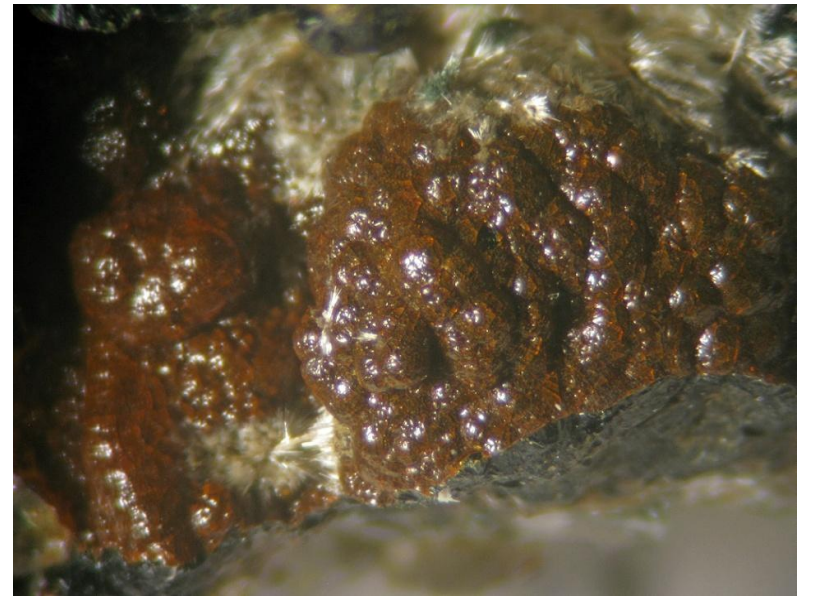
TM u1353 (BC195) Palermo Mine, N Groton, NH 8 mm FOV



TM u2023 (BC215) Palermo #1, N. Groton, NH 7 mm FOV

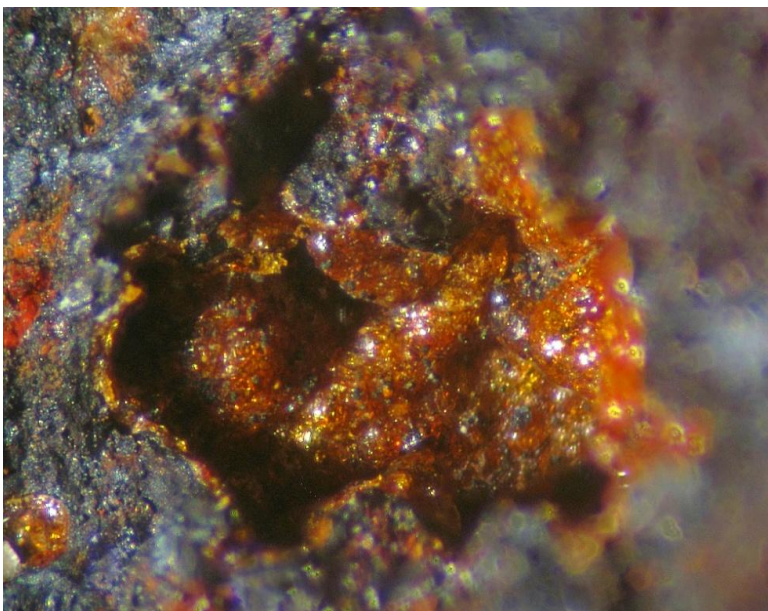


TM u1637 (Falster WDS) Chickering Mine, Walpole, NH 0.7 mm FOV

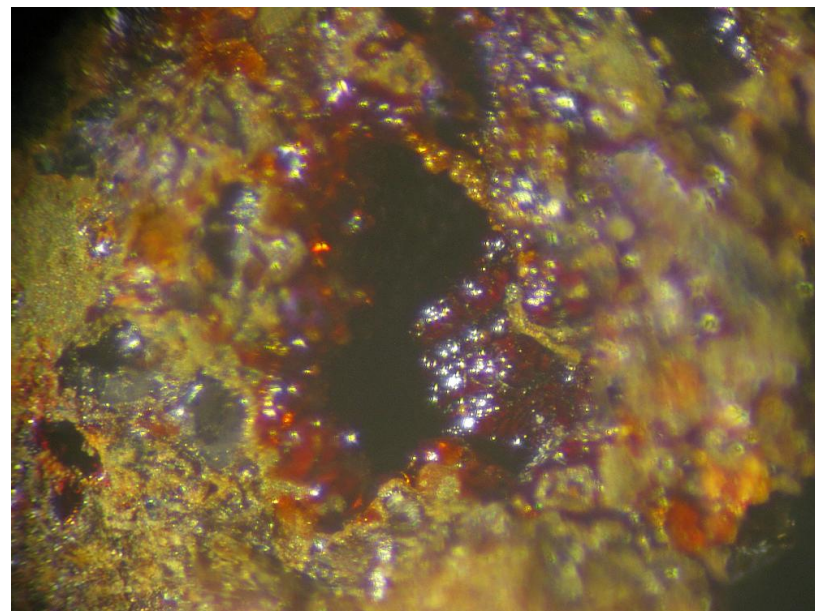


RM (EDS BC210) Palermo Mine, N. Groton, NH 12 mm FOV

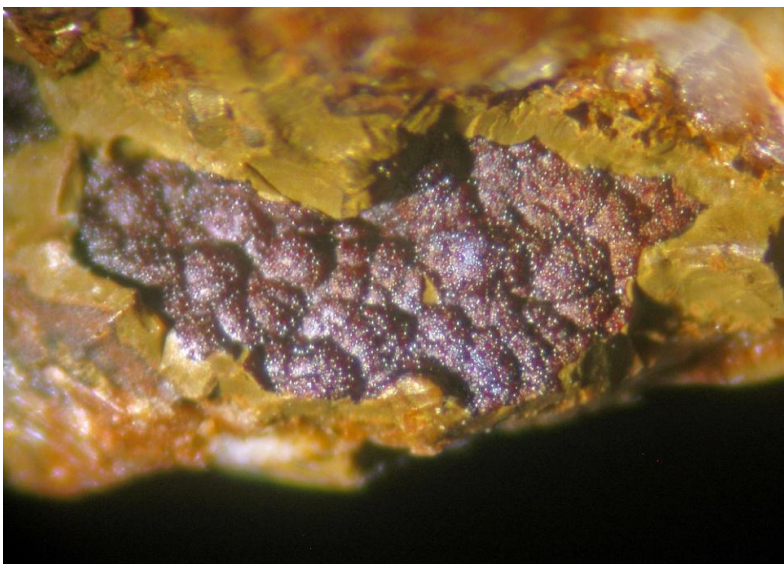




RM (EDS BC211) Palermo #1 Mine, N. Groton, NH 2.5 mm FOV



RM (EDS BC212) Palermo #1 Mine, N. Groton, NH 2 mm FOV



RM (EDS BC213) Palermo #1 Mine, N. Groton, NH 4 mm FOV



RW (EDS PL205) Plume Mine, N. Groton, NH 4 mm globule

## “Diadochite – like” EDS analysis

EDS Ref.	Specimen ID	Locality	KeV	Max count	Chemistry from Atomic % (normalized to 3 Fe)
BC194	TM TBC	Chickering Mine, Walpole, NH	15	850	$(\text{Fe}_{2.2}, \text{Mn})\text{O}_{7.4}$ *
BC195	TM u1353	Palermo, N. Groton, NH	15	650	$\text{Fe}_3\text{Ca}_{0.47}\text{P}_{2.61}\text{O}_{12.2}$
BC210	RM	Palermo #2, N. Groton, NH	25	190	$\text{Fe}_3\text{Ca}_{0.51}\text{P}_{4.2}\text{O}_{76.5}$
BC211	RM “10/65”	Palermo #1, N. Groton, NH	25	1000	$\text{Fe}_3\text{Ca}_{0.32}\text{P}_{7.46}\text{O}_{150.5}$
BC212	RM MWS 1179	Palermo #1, N. Groton, NH	25	370	$\text{Fe}_3\text{P}_{1.67}\text{O}_{19.5}$
BC213	RM 607.01	Palermo #1, N. Groton, NH	25	380	$\text{Fe}_3\text{O}_{29.2}$ *
BC215	TM u2023	Palermo #1, N. Groton, NH	15	310	$\text{Fe}_3\text{Ca}_{0.58}\text{P}_{1.82}\text{O}_{16.6}$
AM10	Uncertain	Chickering Mine, Walpole, NH	25	ukn.	“A Mn rich siderite” (K. Day)

\* Small phosphorous present but not quantified.

As part of the Chickering Mine minerals study Al Falster did a three probing **WDS** analysis of a Chickering “diadochite” (my # u1637) (Chickering 9-1 to 9-3).

Al’s analysis gave results in weight percent oxide.

The percent oxides only totaled to about 85%; (should be close to 100).

The averaged result was:  $\text{P}_2\text{O}_5 = 31.7\%$ ,  $\text{FeO} = 47.7\%$ ,  $\text{MnO} = 3.9\%$ ,  $\text{CaO} = 1.7\%$ .

Al stated “*I checked on the diadochite, it looks like it is a different species, no S in any noticeable amount!*”

## CONCLUSIONS:

- None of my analyses showed any sulfur, an “essential element” for diadochite, so **NOT DIADOCHITE**.
- Uncertain if the calcium is essential to the chemistry of this “red jelly.”
- “Best fit” candidates for presently IMA approved species include:
- Delvauxite:  $\text{CaFe}^{3+}_4(\text{PO}_4)_2(\text{OH})_8 \cdot 4\text{-}5\text{H}_2\text{O}$  (if Ca is “essential”)
- Santabarbarite:  $\text{Fe}_3^{3+}(\text{PO}_4)_2(\text{OH})_3 \cdot 5\text{H}_2\text{O}$  (if Ca is not “essential”)