"Diadochite – like" EDS analysis

EDS Ref.	Specimen ID	Locality	KeV	Max count	Chemistry from Atomic % (normalized to 3 Fe)	Note
BC194	TM TBC	Chickering Mine, Walpole, NH	15	850	$(Fe_{2.2},Mn)O_{7.4}$	2
BC195	TM u1353	Palermo, N. Groton, NH	15	650	$Fe_3Ca_{0.47}P_{2.61}O_{12.2}$	
BC210	RM	Palermo #2, N. Groton, NH	25	190	$Fe_3Ca_{0.51}P_{4.2}O_{76.5}$	
BC211	RM "10/65"	Palermo #1, N. Groton, NH	25	1000	$Fe_3Ca_{0.32}P_{7.46}O_{150.5}$	
BC212	RM MWS 1179	Palermo #1, N. Groton, NH	25	370	$Fe_3P_{1.67}O_{19.5}$	1
BC213	RM 607.01	Palermo #1, N. Groton, NH	25	380	$Fe_3O_{29.2}$	2
BC215	TM u2023	Palermo #1, N. Groton, NH	15	310	$Fe_3Ca_{0.58}P_{1.82}O_{16.6}$	
AM10	Uncertain	Chickering Mine, Walpole, NH	25	ukn.	"A Mn rich siderite"	3

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 (as opposed to our BC Atomic % results). The percent oxides only totaled to about 85%; (should be close to 100). The averaged result was: P_2O_5 = 31.7%, FeO = 47.7%, MnO = 3.9%, CaO = 1.7%. Webmineral analysis of santabarbarite has: P = 29.5%, Fe_2O_3 = 43.9%, Mn_2O_3 = 2.2%, H_2O = 23.8%. (This seems quite close to me.)

General notes:

- ID initials: RM = Ray Meyers specimen, TM = Tom Mortimer specimen.
- "Max count" is the peak (X Ray) count for the highest element peak in the spectrum plot. Typically you would like this to be at least in the high hundreds. Low values give lower element identification ability with higher error & uncertainty. (I do not know why some data collections have such low peak counts.)
- BC210 through BC213 analyses were done (inadvertently) with a 25 KeV beam voltage. It would have been much better to use 15 KeV. I should redo these.
- Also have an un-cataloged G.F. Smith Mine "diadochite" – collected 10-2017.
- These lustrous ball "diadochite" clusters are almost impossible to photo without lost of bright reflections.

Reference chemistries:

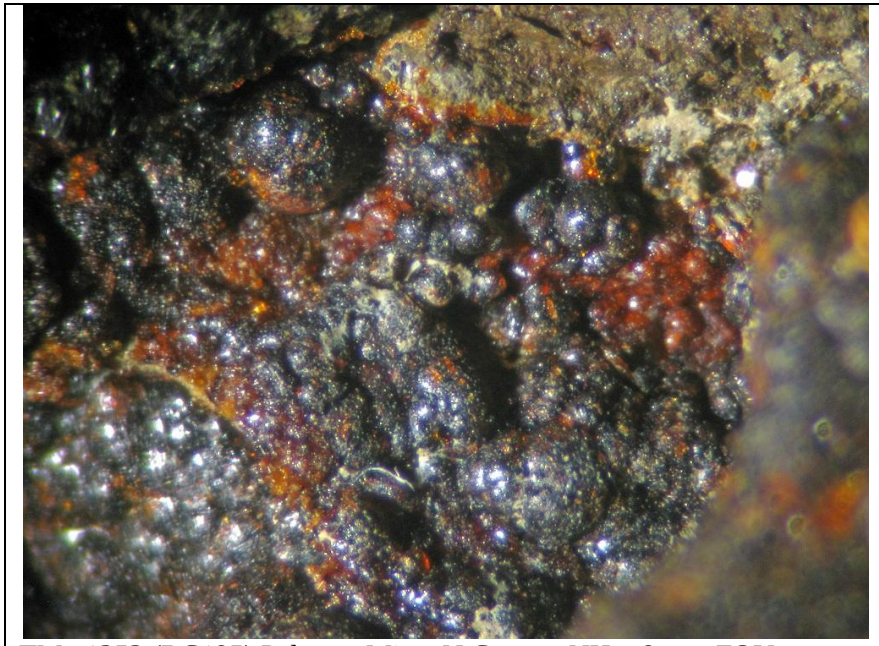
Diadochite: $Fe^{3+}_2(PO_4)(SO_4)(OH) \cdot 6H_2O$

Santabarbarite: $Fe^{3+}_3(PO_4)_2(OH)_3 \cdot 5H_2O$

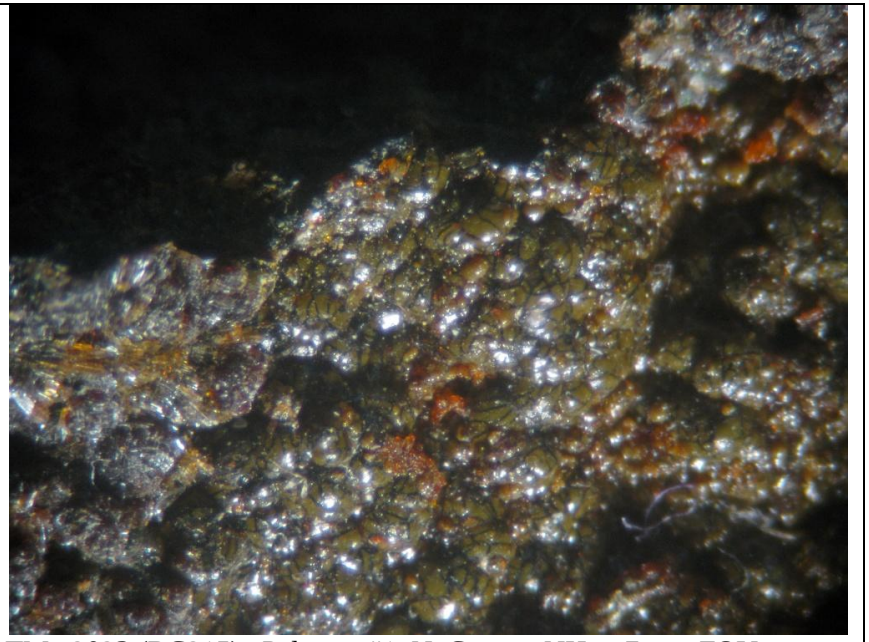
Ludlamite: $(Fe,Mn,Mg)_3(PO_4)_2 \cdot 4H_2O$

Numbered Notes:

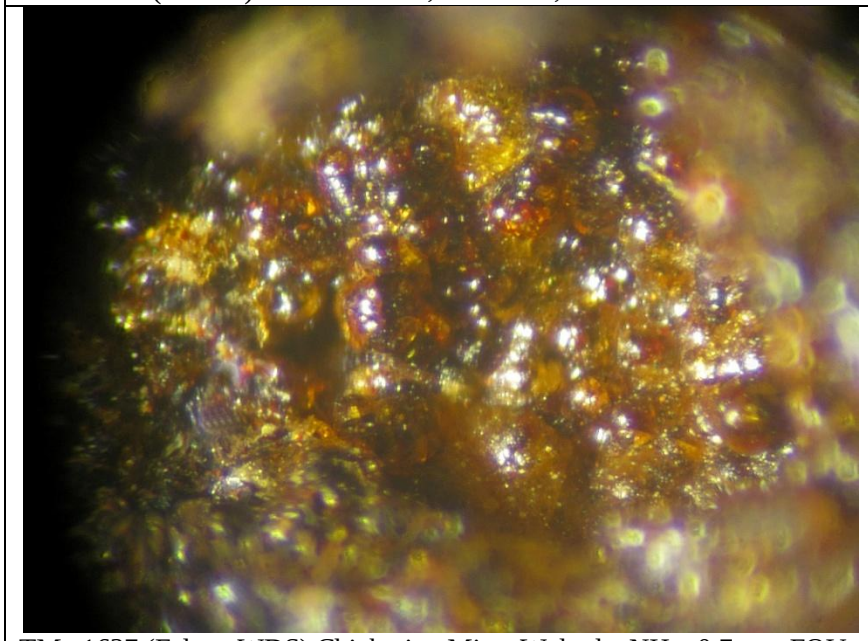
1. Ca peak present in plot but not identified by element assignments.
2. Small P peak present in plot but not identified by element assignments.
3. I have 4 cataloged Chickering Mine "diadochites" (self collected), #u891 (in my NH display and on web), #u1153, u1154, & u1637. Unknown which specimen provided source for Kerry Day AM10 (set 13 – I have the block) analysis. Different spot on grain indicated a coating on ferrocolumbite.



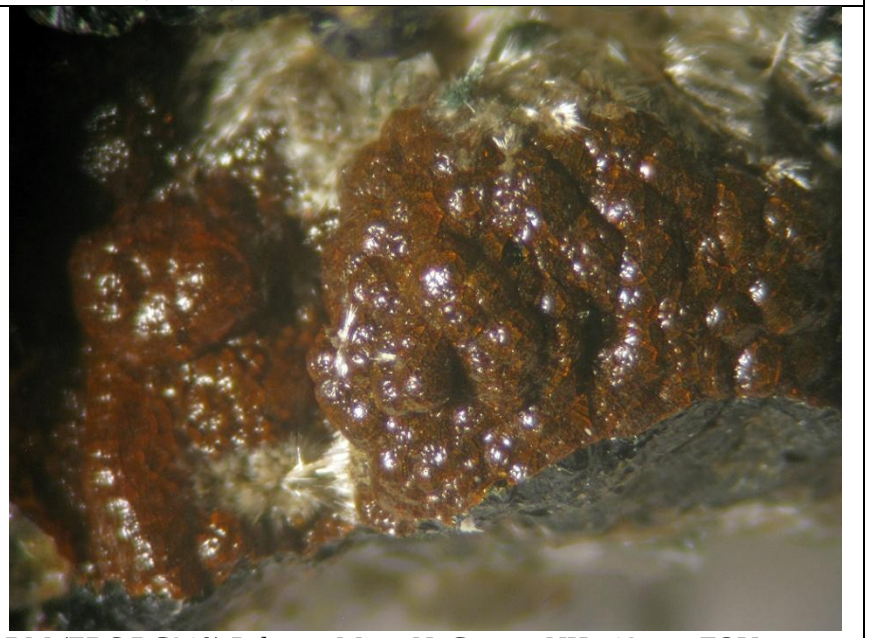
TM u1353 (BC195) Palermo Mine, N Groton, NH 8 mm FOV



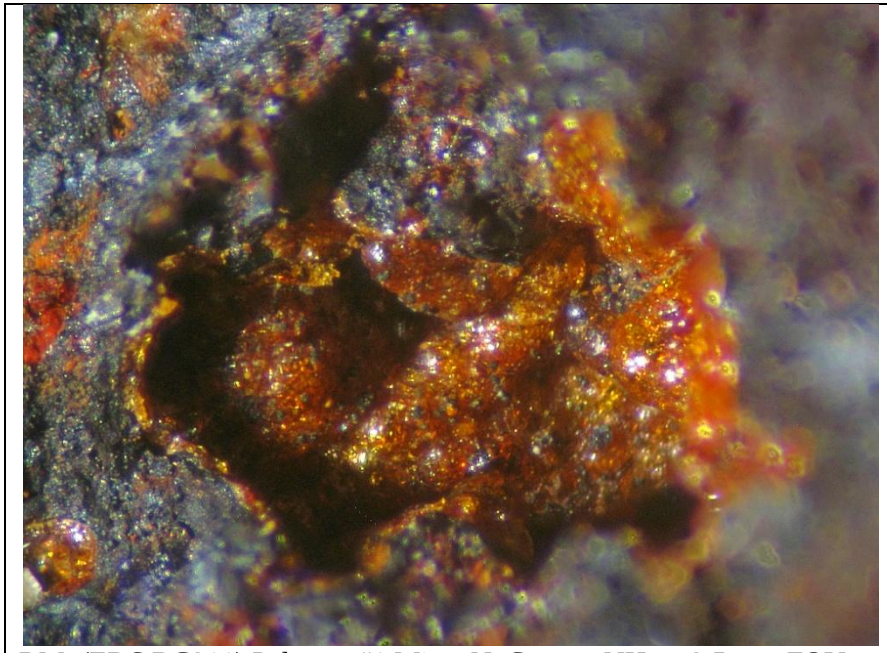
TM u2023 (BC215) Palermo #1, N. Groton, NH 7 mm FOV



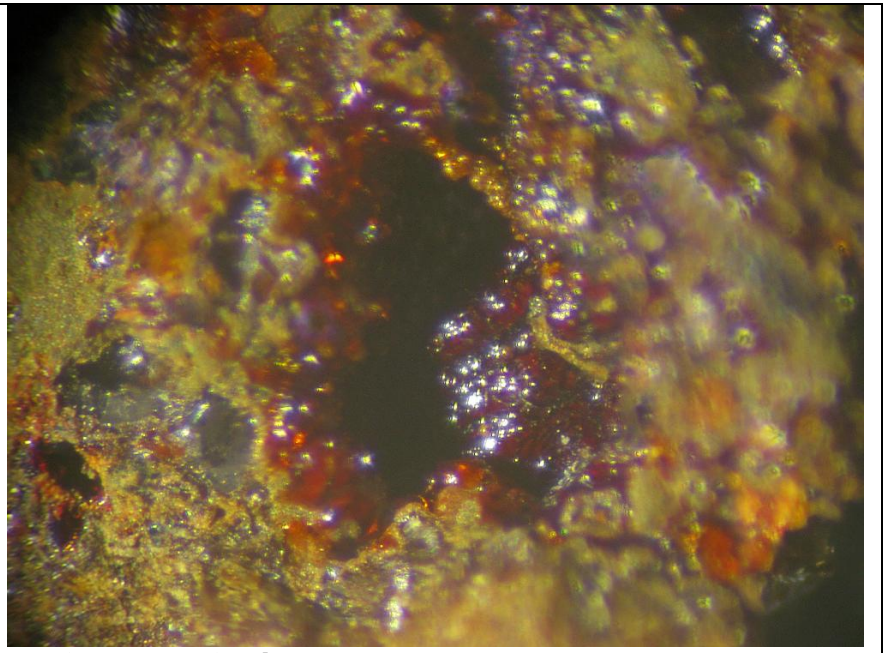
TM u1637 (Falster WDS) Chickering Mine, Walpole, NH 0.7 mm FOV



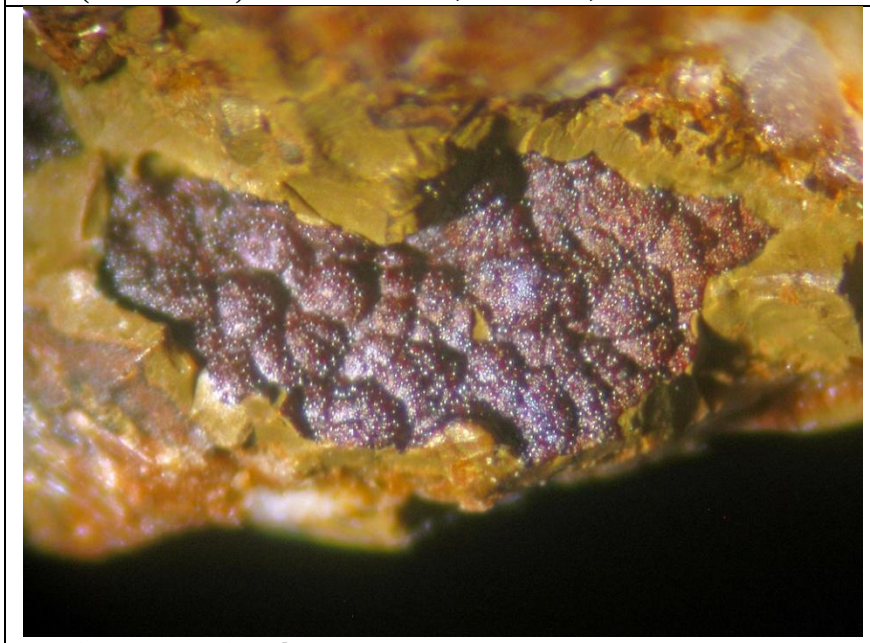
RM (EDS BC210) Palermo Mine, N. Groton, NH 12 mm FOV



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