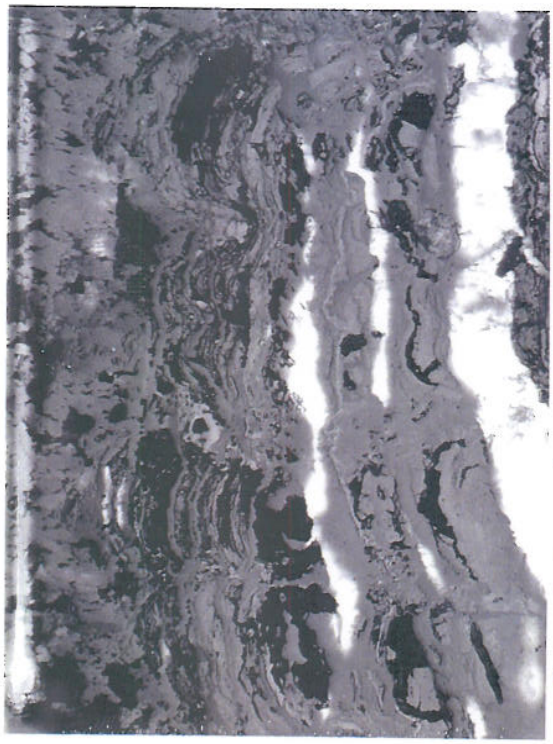
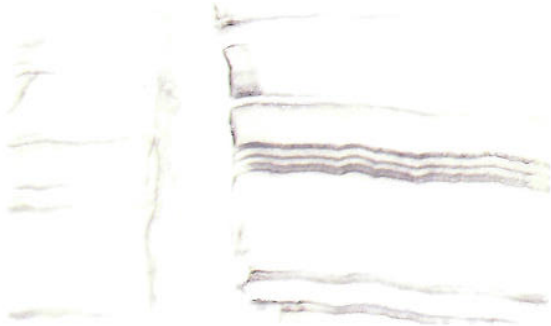
Insular



1283-14-2A. 10X20 Photo 9



1283-20-11A . 10X10 . Photo 30

1283-14-2A . 10X20 . Photo 10

1983-10-7

massive manganese deposit.

~~slightly [illegible] + pyrolusite~~

All pyrolusite (?) ← XRD.

1983-12-11

massive manganese deposit

characterized by parallel sequence

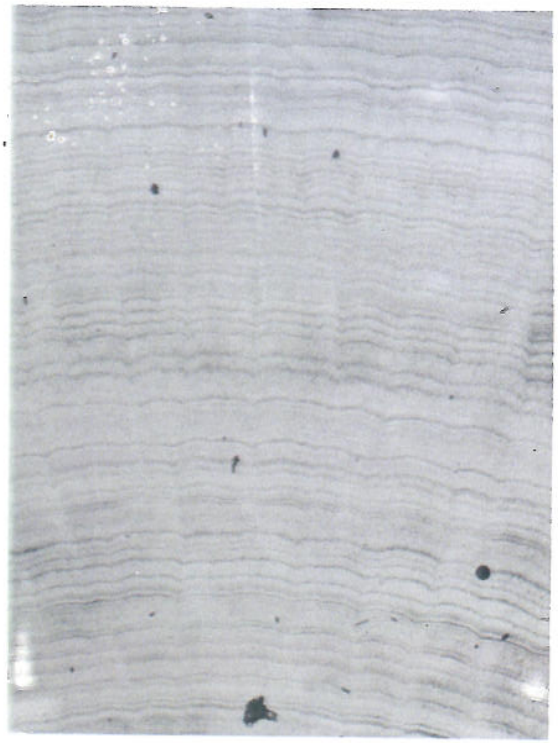
replaced pyrolusite occur as layer (band)

minimum three facies exist (photo 20);

~~psilomelane~~ (?) todorokite and pyrolusite

1983-14-2A

? ? ?

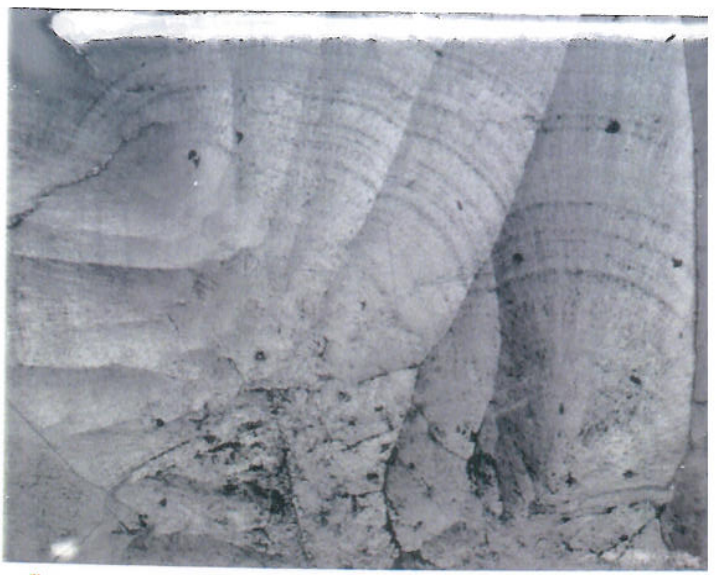


1283 -20-5 10x5. 0.23. open(2)

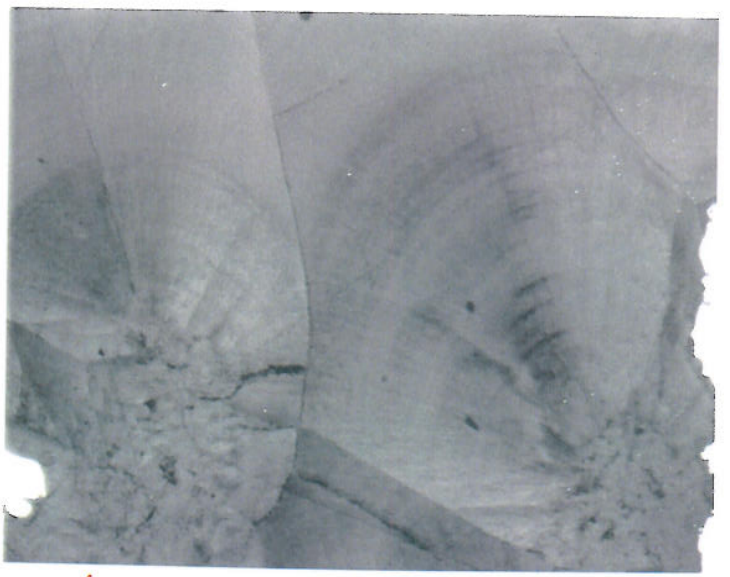
1283-20-5 10x5. 0.23. x 0.120/.

1283-20-5 10x5 photo 25

1283-20-5 10x20 ph. 26



1283-20-5 10x5 no. 21. X nic



1285-20-5 - 10x5 No 20 X Nicols

No 1P-A

1283-20-5

Typical manganese todorokite deposits.
Sample show compact and massive todorokite layers and also highly weathered and replaced layers.
Deposit seems to be originated by todorokite [illegible] as shown it characteristic texture of radial-fibrous and spherulitic organizations and continuous growth of upward axial elongation.
Upper part, sample show highly weathered and replaced to pyrolusite grains. Pyrolusite grains primarily present as cavity-filling with relatively perfect idiomorphic coarse grains and also as replacement of todorokite at weathered grain-boundary. Sometimes, porous and loosely compacted todorokite grains are slightly replaced by pyrolusite, rather than compact layers.
This implies that todorokite crystallization was relatively rapid, discontinuous and different intensity.

photo 19 : todorokite growth with radial fibrous texture and with different intensity (porosity).

photo 20 : todorokite crystallization begin on germs and develope as spherulitic growth texture

photo 21 : todorokite crystallization show various growth axis

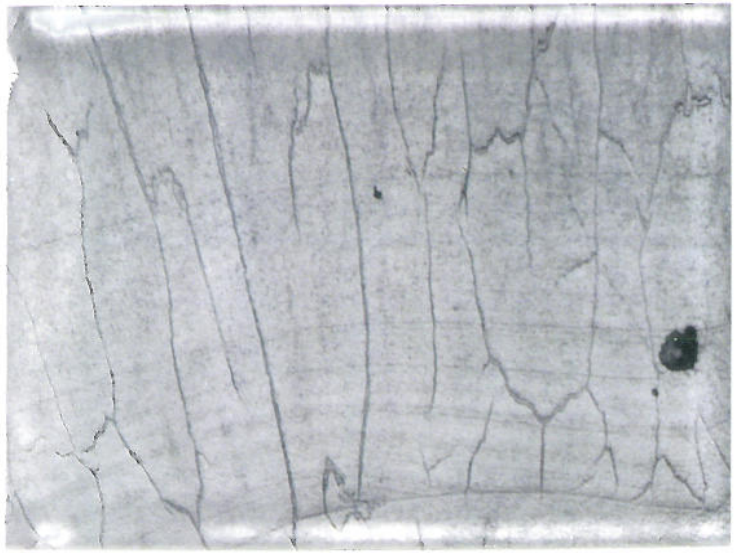
photo >3 (X nichols) and >4 (open nichols)
In the middle of todorokite stringer
compact and massive layer with rhythmic texture (photo >
variations in color are due to the difference in density
and slight different chemistry and mineralogy

photo >5 : replacement by pyrolusite
replacement occurred only weathered area, where
would be directly contact air & water and porous brittle
compacted manganese layer.
pyrolusite grain size decrease to the inside of
todorokite layer.

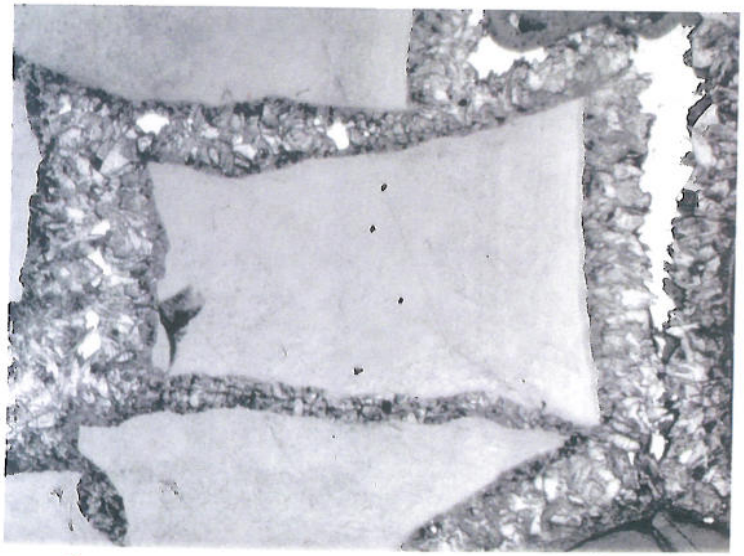
photo >6 : high magnification of contact zone.
a fragment of todorokite is replacing by pyrolusite

photo >7 : magnification of boundary area.
even inside of todorokite, where is relatively
porous and loose density can be replaced
and show zonal replacement.

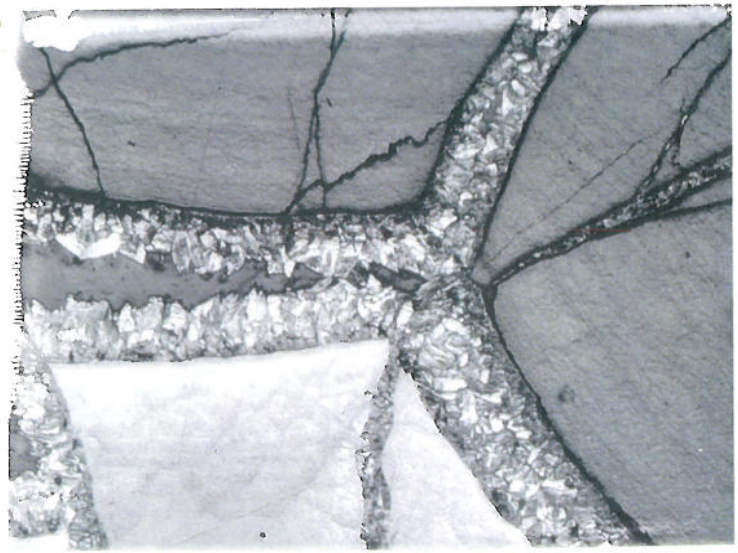
photo >8 : zonal replacement on todorokite layers



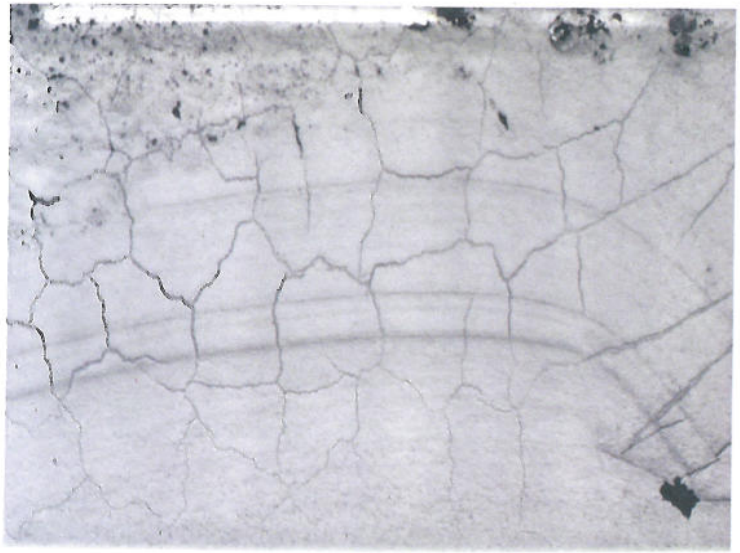
1283-20-1B 10X5 Photo 12



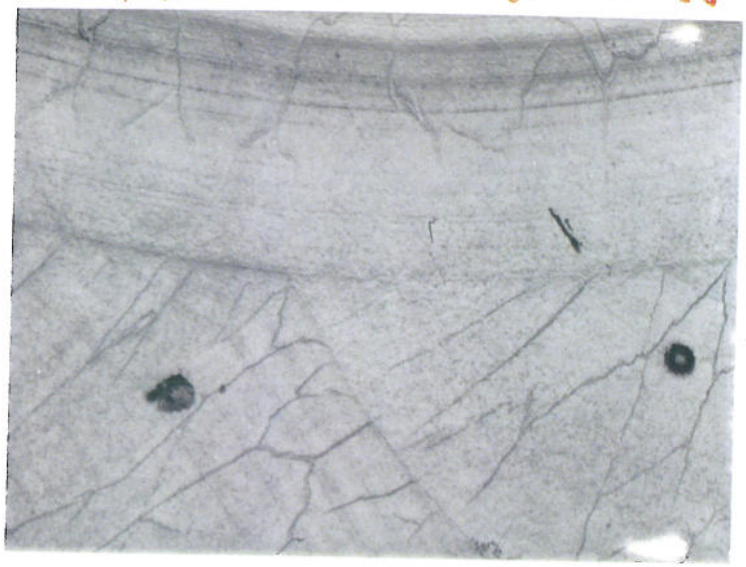
1283-20-1B 10X5 Photo 18



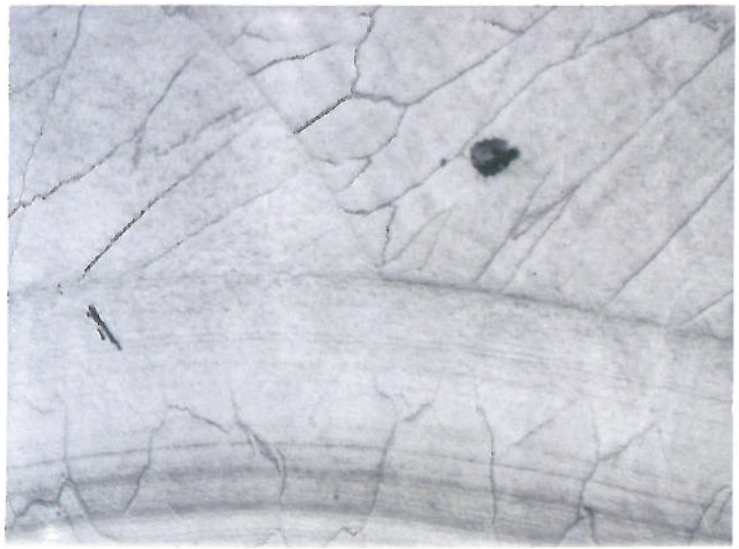
1283-20-1B 10X5



1283-20-1B 10x5 Photo 13



1283-20-1B 10x5 Photo 16



1283-20-1B 10x5 Photo. 14

1283-20-1B 10x5 Photo 17

1283-20-1B

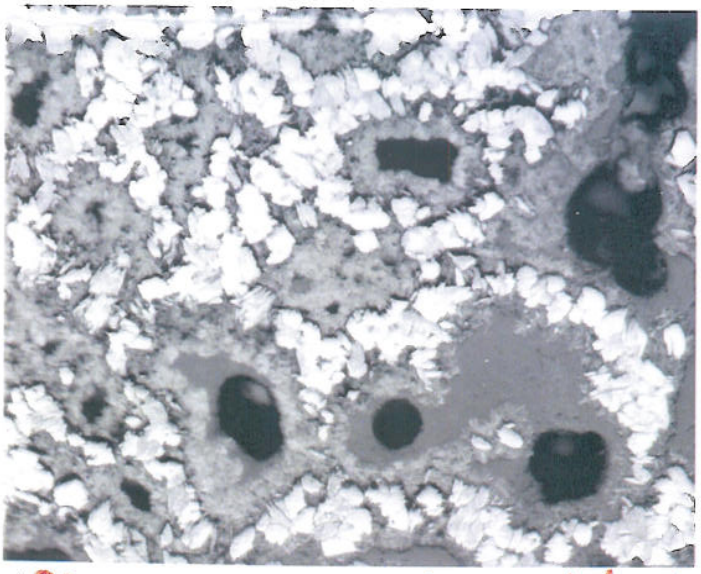
- massive manganese deposit
  deposit is consist of massive and compact manganese mineral as primary product, todorokite (?) and secondary product, pyrolusite.

- primary minerals have irregular fractures, which is filled with pyrolusite grains (photo 1&)

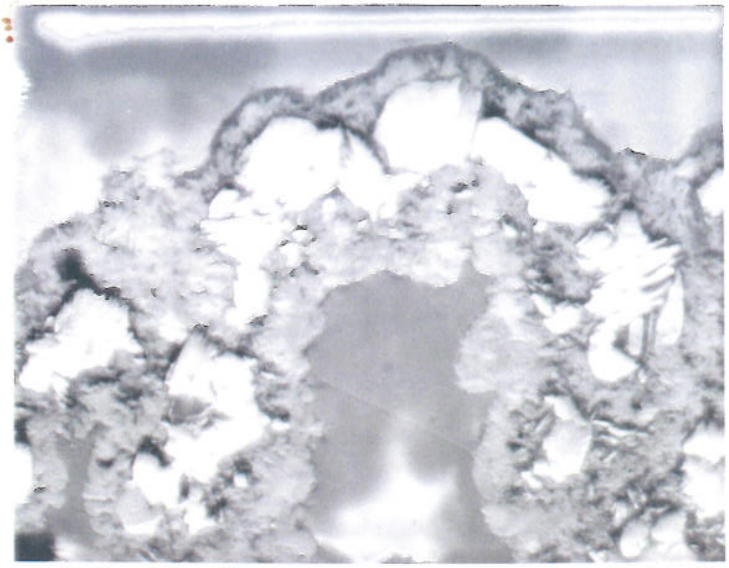
- primary minerals more ∧ replaced by pyrolusite, which present as pseudomorphus retaining former crystal form and are characterized by its parallelly oriented fractures (photo 12) and shrinkage cracks (photo 13).
  this oriented fractures is the results of H_2O loss where primary mineral, todorokite converted to pyrolusite.

- Photo 14 and 15 show growth (crystallization) of primary manganese mineral with different growth axis. All of those are entirely converted to pyrolusite.

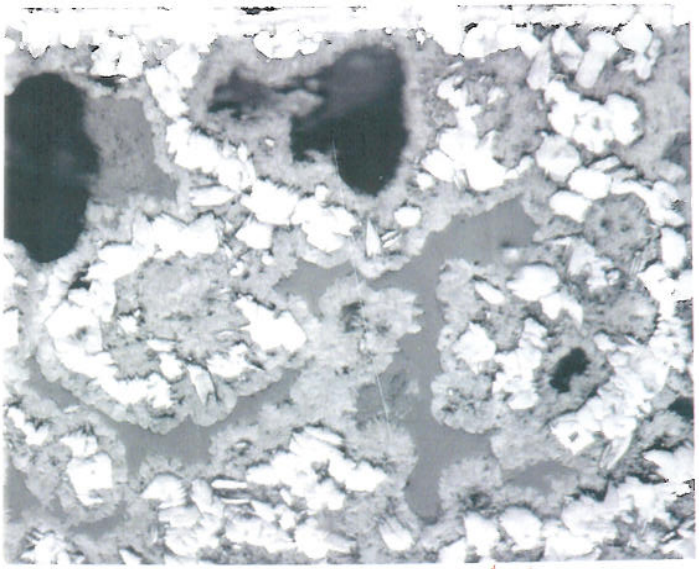
- Photo 16 and 17 show three kinds sequences from bottom, todorokite replaced by pyrolusite through unknown manganese layer to top, lime deposit. Every boundary is quite sharp.



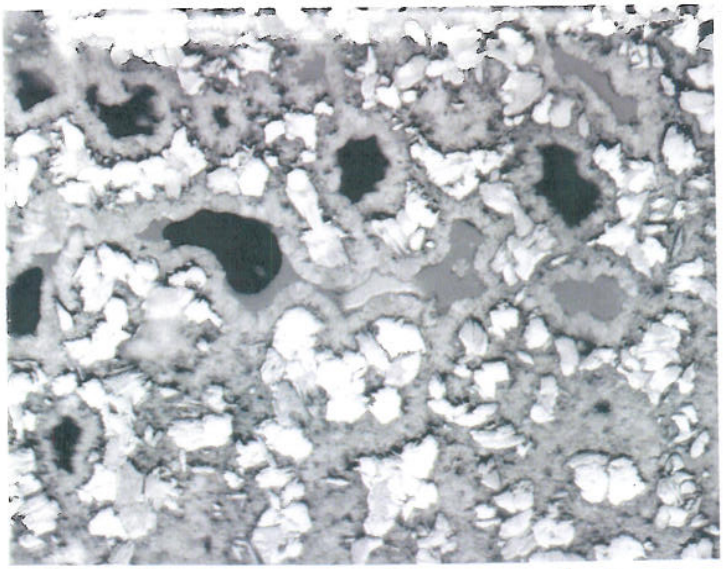
283-13-3 10x50 Photo 6.



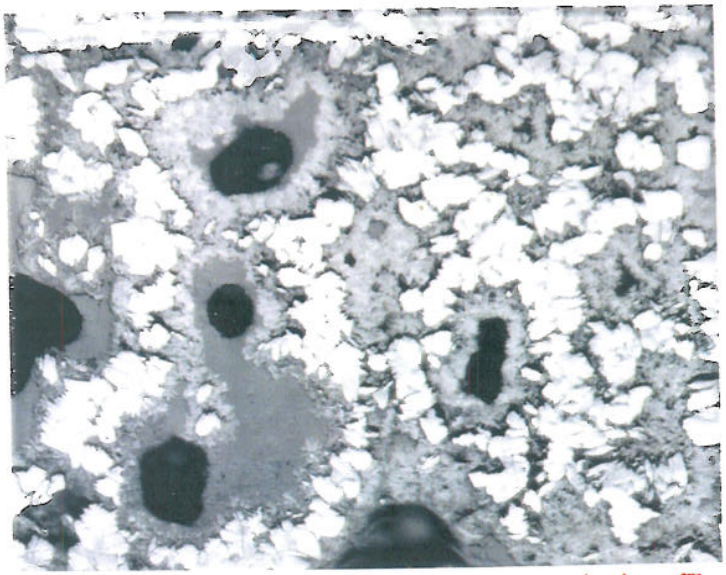
1283-13-3 10x100 Photo 8



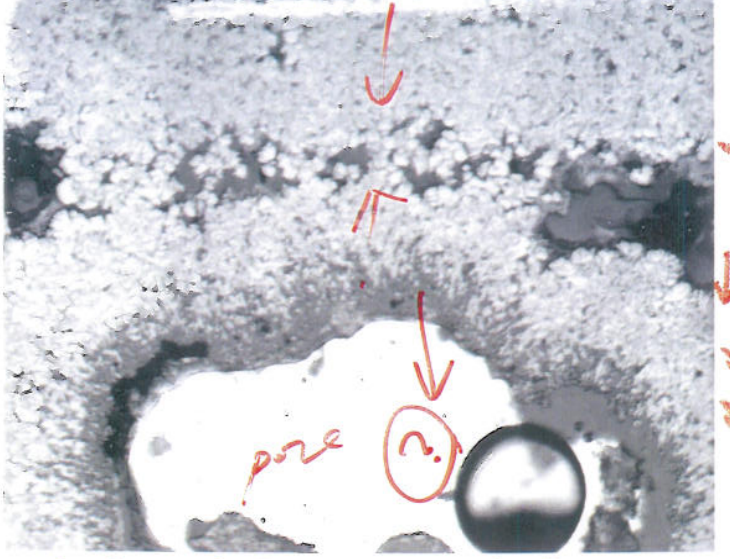
283-13-3 10x50 Photo. 4



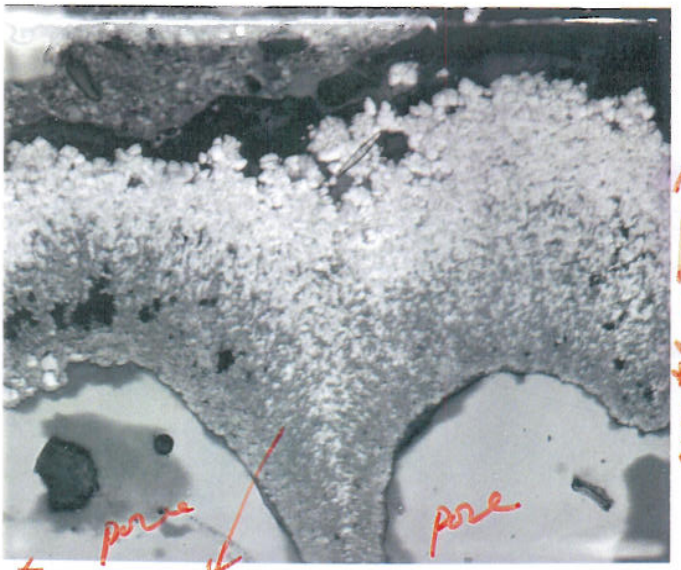
1283-13-3 10x50 Photo 7



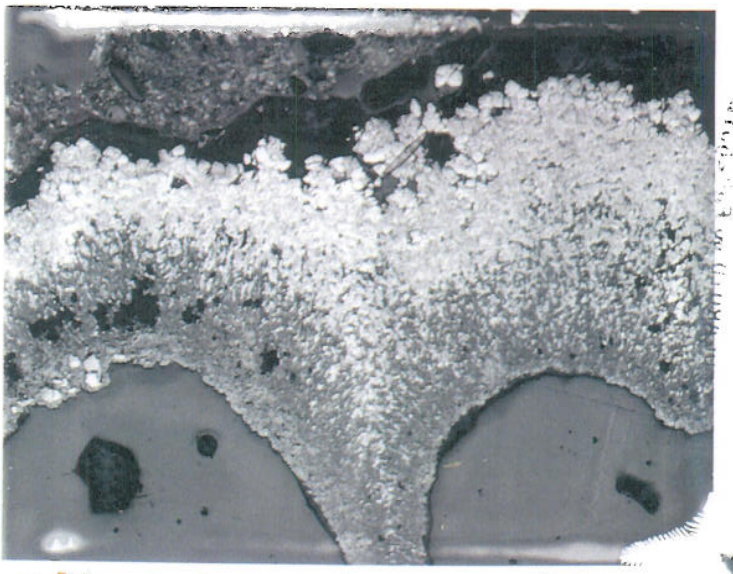
1283-13-3 10x50 Photo. 5



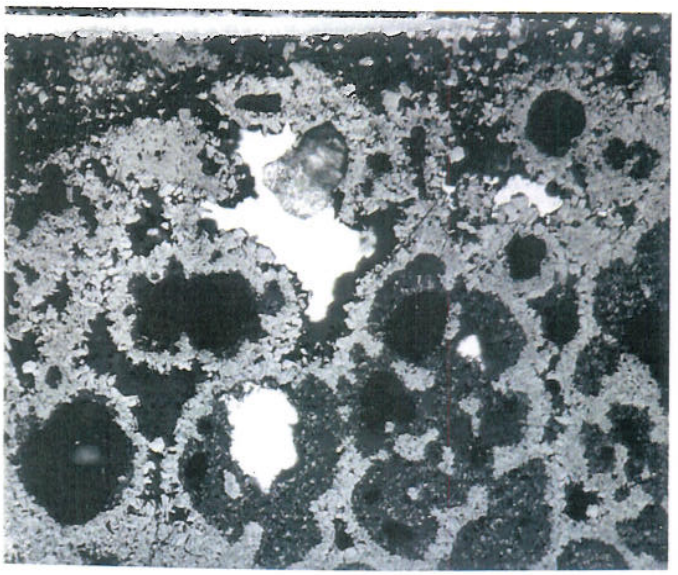
13-3 . 40X20 . Pl. 3



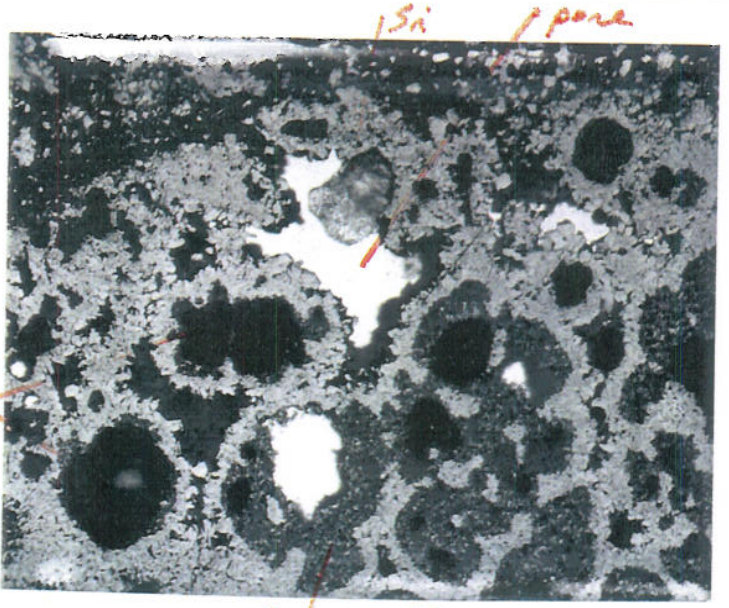
to 2



1283-13-3 10X20 Photo 2



3-13-3 10X20 No. 1



1283-13-3 10X20

1283-13-3

- highly weathered sample, which implies that primary manganese mineral, probably todorokite (impossible exact identification by microscope), is replaced by pyrolusite

- pyrolusite, fine grained aggregates occur as a result of the secondary origine by replacement from almost all primary mineral of todorokite.

- This replacement result from high weathering of todorokite, generally starting grain boundaries and sometime from the center of todorokite grains where are supposed to be loosely compact. However, fine grained aggregates originate from gels in pore-spaces or cavities with relatively idiomorphic forms.

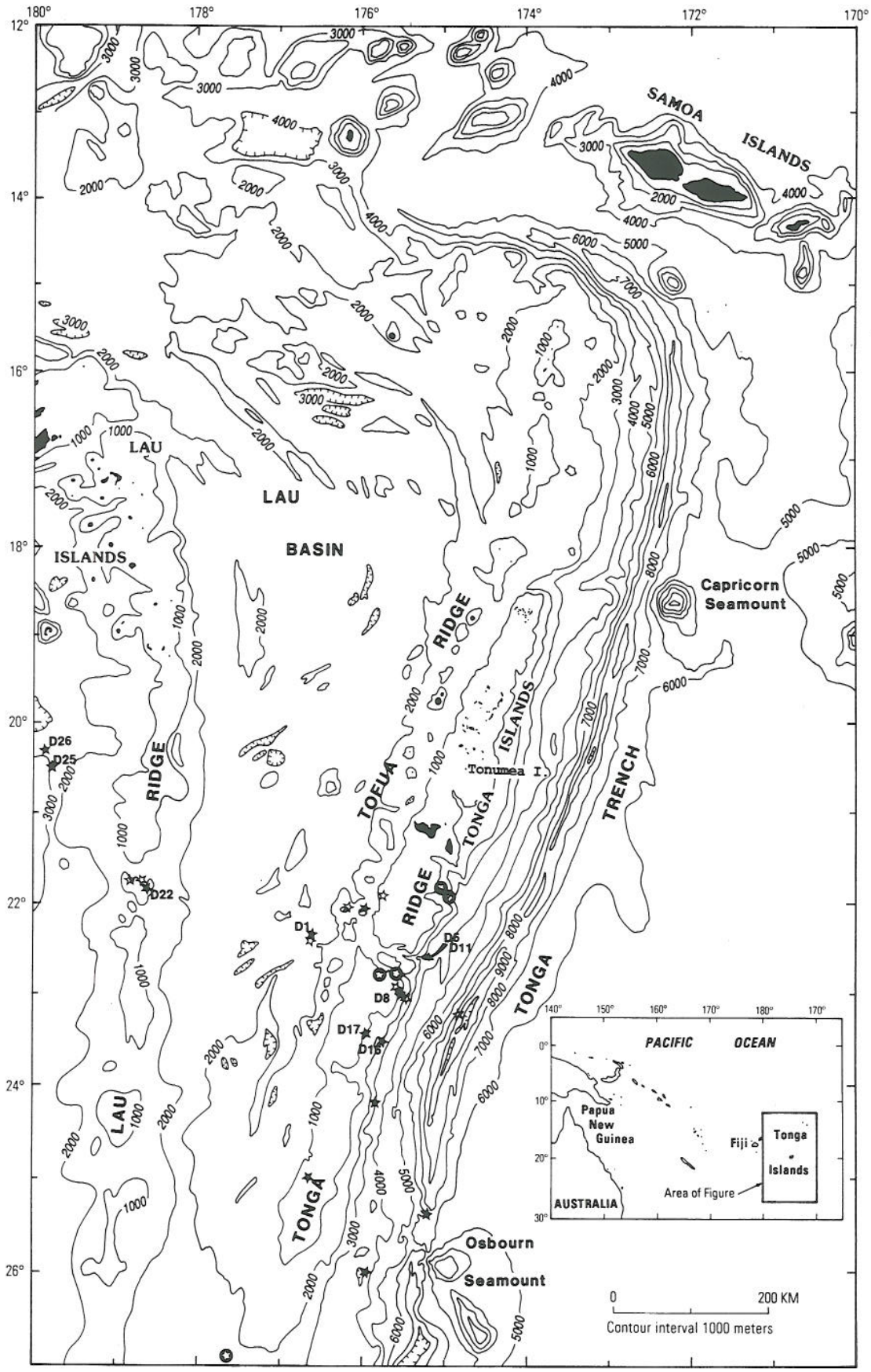
- conclusively, sample 1 was originated by todorokite (?) and during the weathering todorokite is replaced by pyrolusite.

Photo 1. secondary orifine pyrolusite grain aggregation (white), characterizing as circular form occurrence
Black is silicate grains, bright areas are pore-spaces, dark gray which contain very small spots (grains) seems to be primary manganese mineral and is on-going replacement to pyrolusite

Photo 2 and 3. Close on-going replacement.
primary manganese mineral (todorokite ?, dark gray) is replacing to pyrolusite. Grain boundary has strongly weathered zone where relatively pyrolusite grains crystallize while inside of primary grains are not yet completely weathered and replaced, showing needle-like pyrolusite grains.

photo 4. 5. 6. 7 and 8. very fine pyrolusite grain aggregates.
pyrolusite grain aggregates occur as circular form and have an association with unknown (?) mineral (gray) inside and outside
unknown mineral has a habit of surrounding circul pyrolusite grain aggregates

© unknown mineral is probably primary products from "gels" and finally alternate to pyrolusite ???


180°
178°
176°
174°
172°
170°
12°
14°
16°
18°
20°
22°
24°
26°
SAMOA ISLANDS
LAU
LAU BASIN
ISLANDS
RIDGE
Capricorn Seamount
TOFUA
TONGA ISLANDS
Tonumea I.
TRENCH
TONGA RIDGE
TONGA
LAU RIDGE
LAU
TONGA
Osbourn Seamount
D26
D25
D22
D1
D6
D11
D8
D17
D15
PACIFIC OCEAN
Papua New Guinea
Fiji
Tonga Islands
AUSTRALIA
Area of Figure
0
200 KM
Contour interval 1000 meters

U. S. GEOLOGICAL SURVEY, MENLO PARK MON 19-SEP-88 14:55
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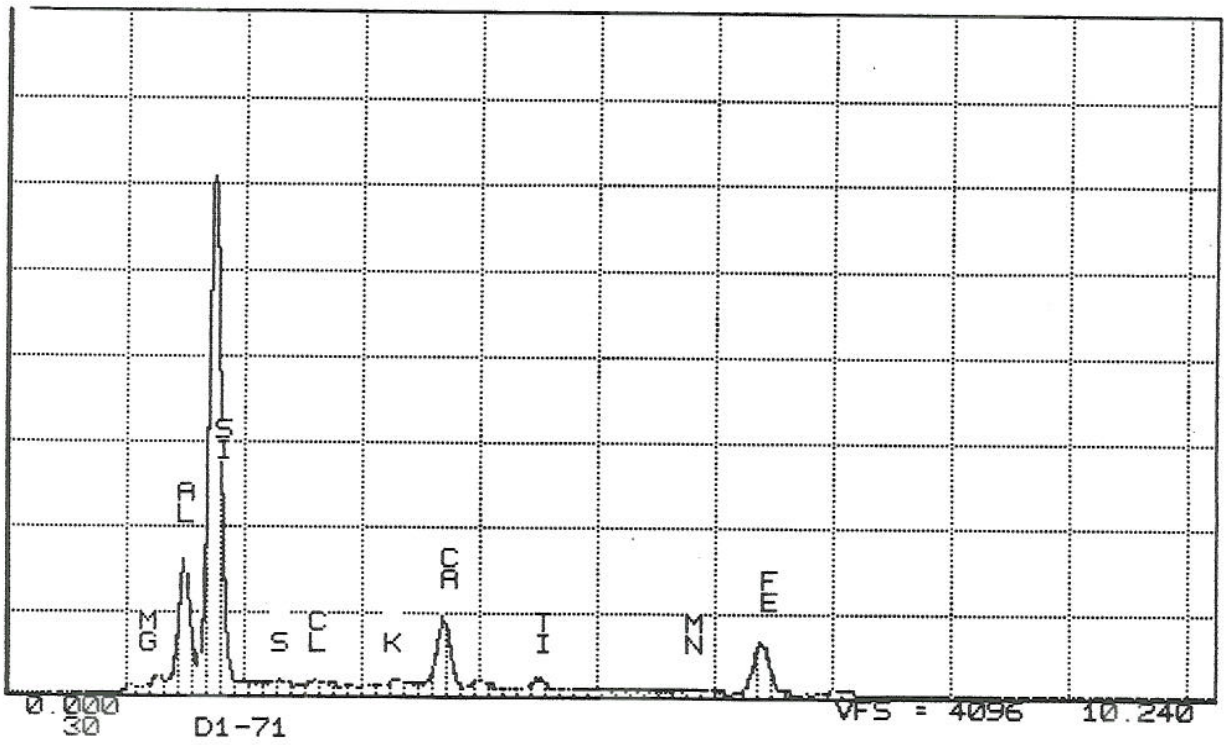

L3-84-SP

Glass Guard Chain. To Compare w/ Ig. chain.

[illegible]

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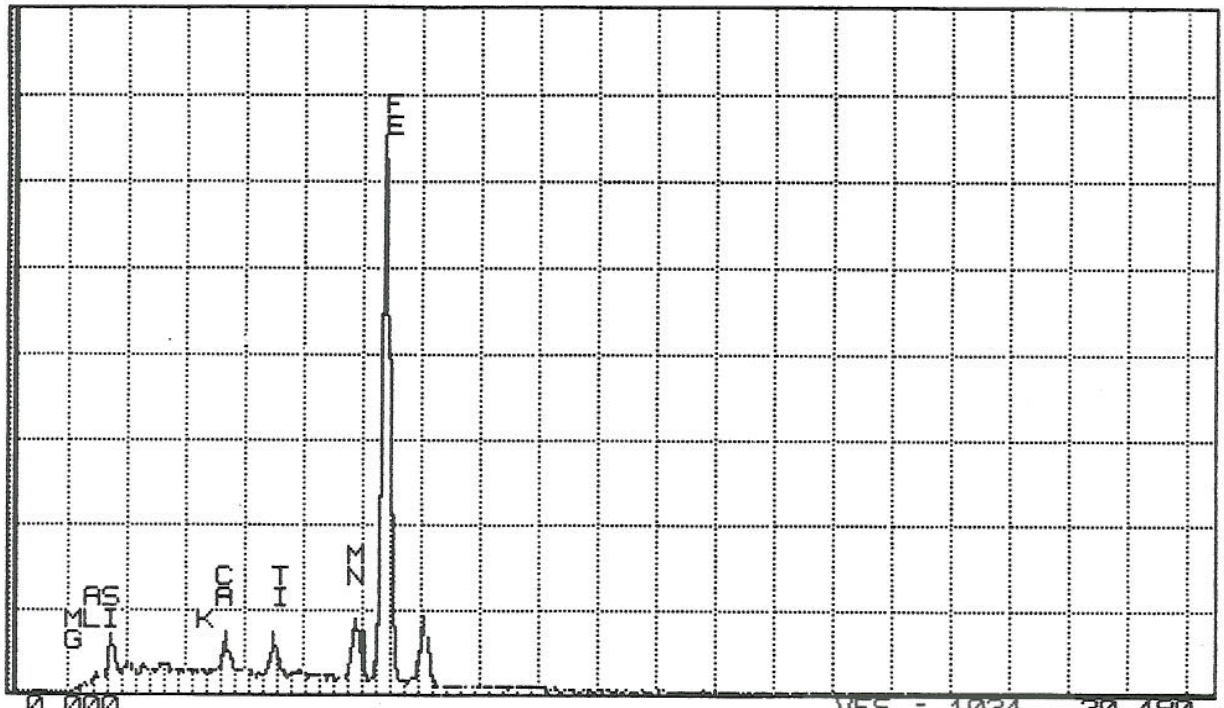

30 very bright layer of photo #9

D-8

U. S. GEOLOGICAL SURVEY, MENLO PARK TUE 13-SEP-88 16:08
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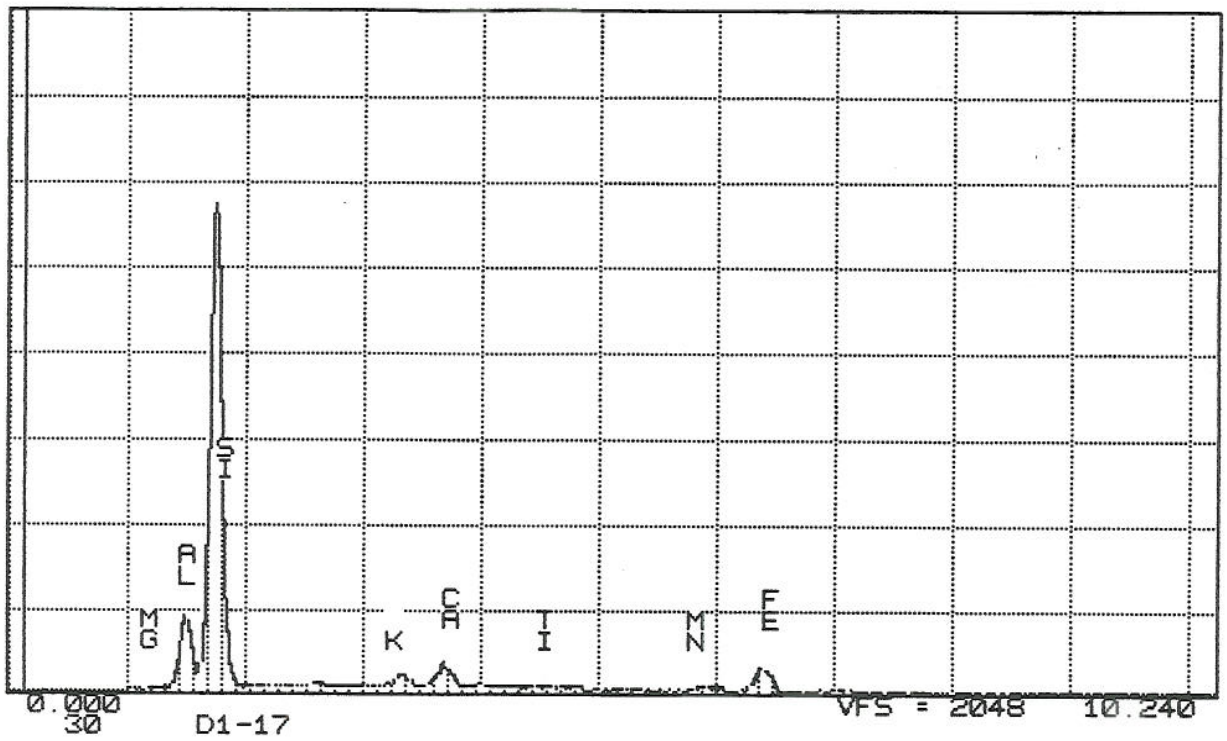

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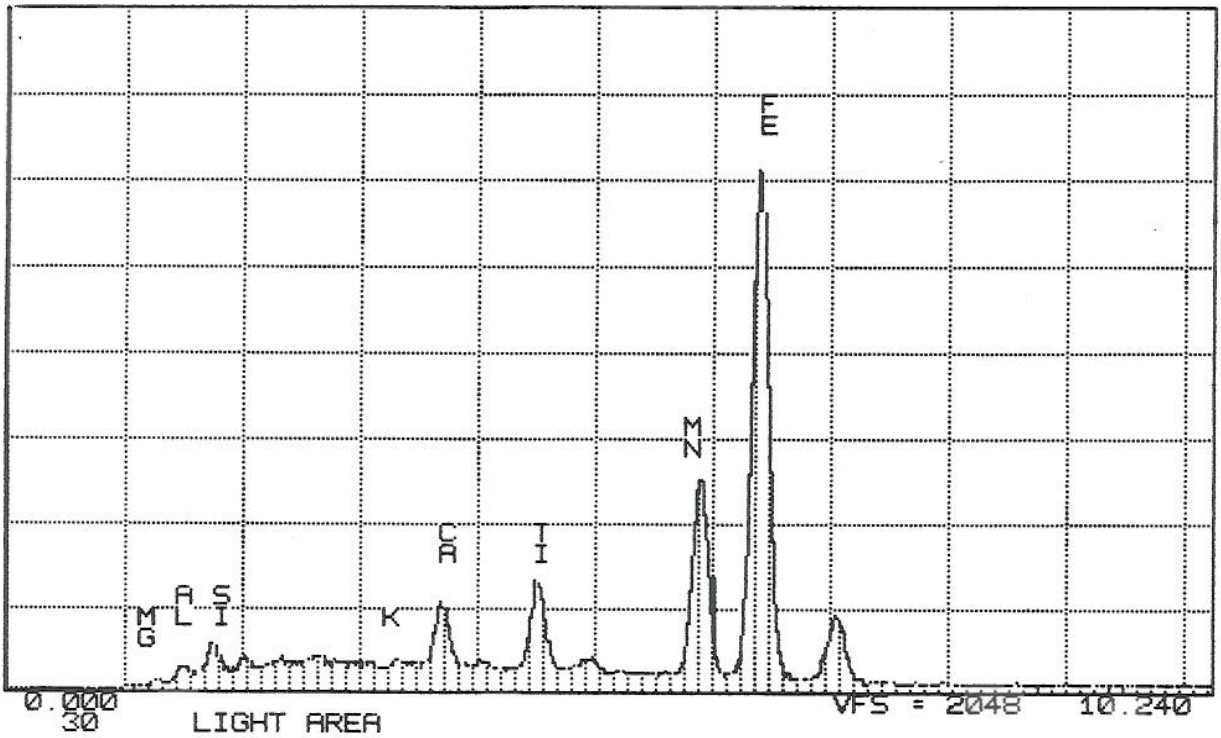

D-8
LS-82-51

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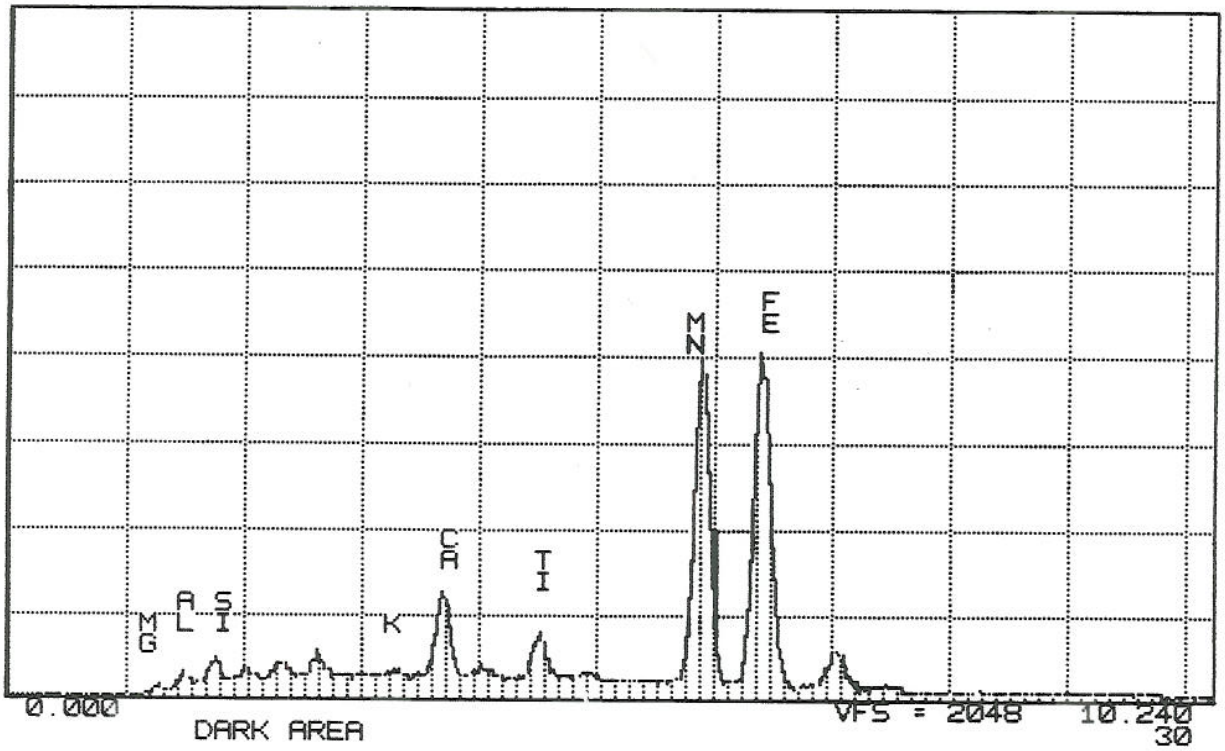

D8
LS-82-SP

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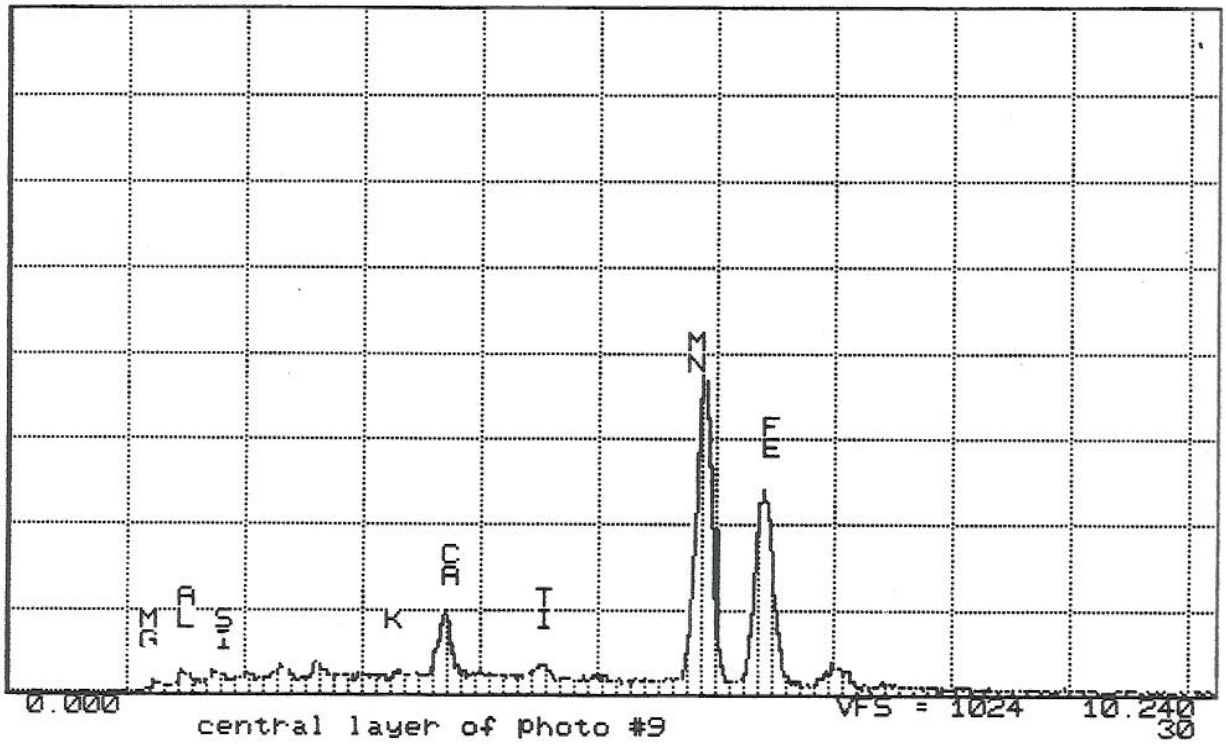

central layer of photo #9

P8
LS-82-9P

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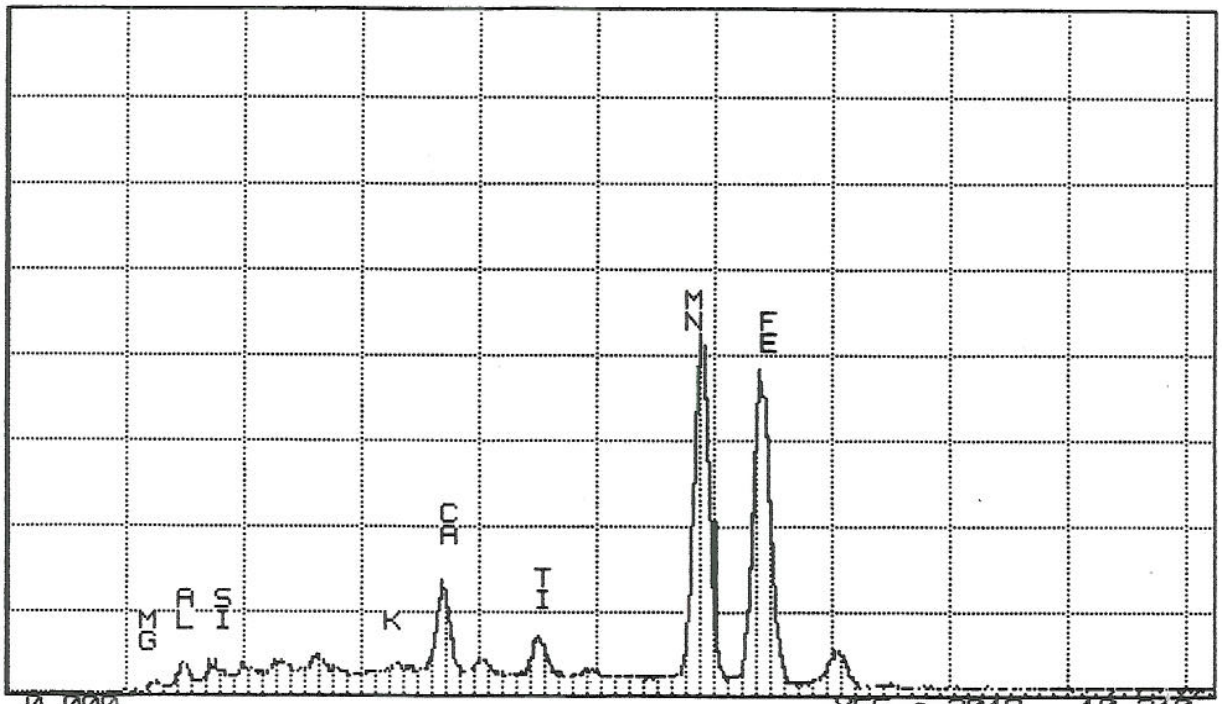

upper left of photo #1

DS
LS-83-SP

U. S. GEOLOGICAL SURVEY, MENLO PARK TUE 13-SEP-88 15:24
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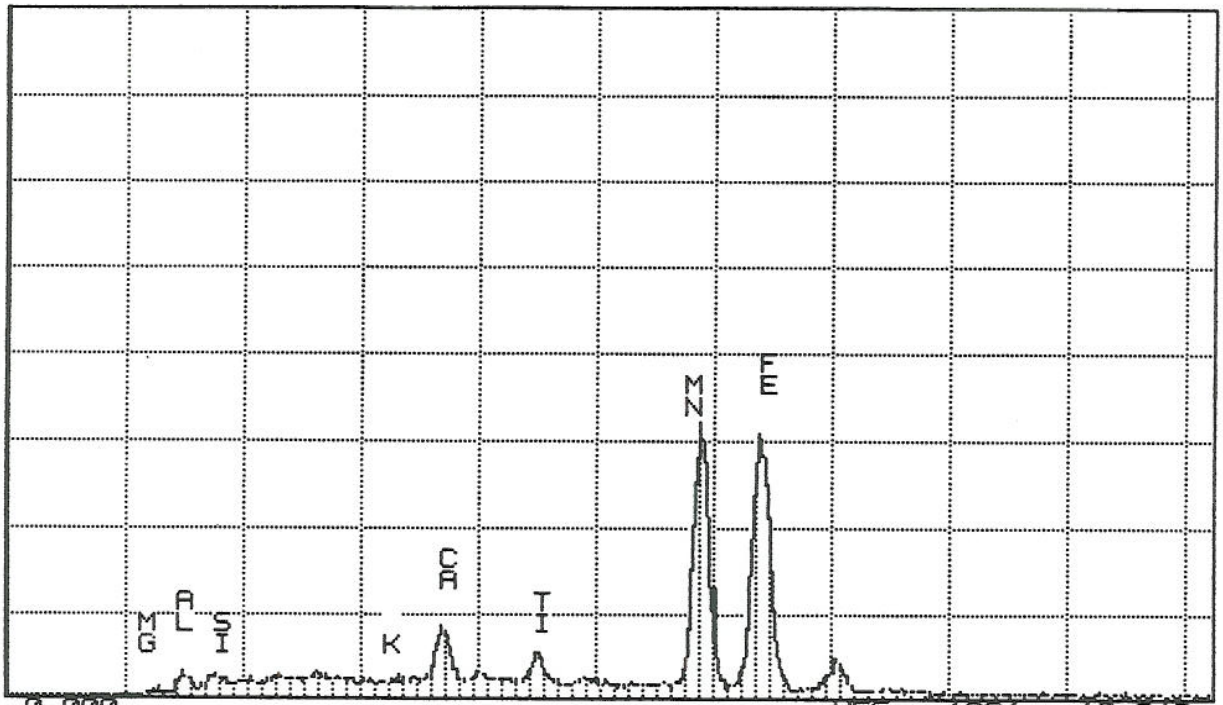

lower layer of photp\o #9

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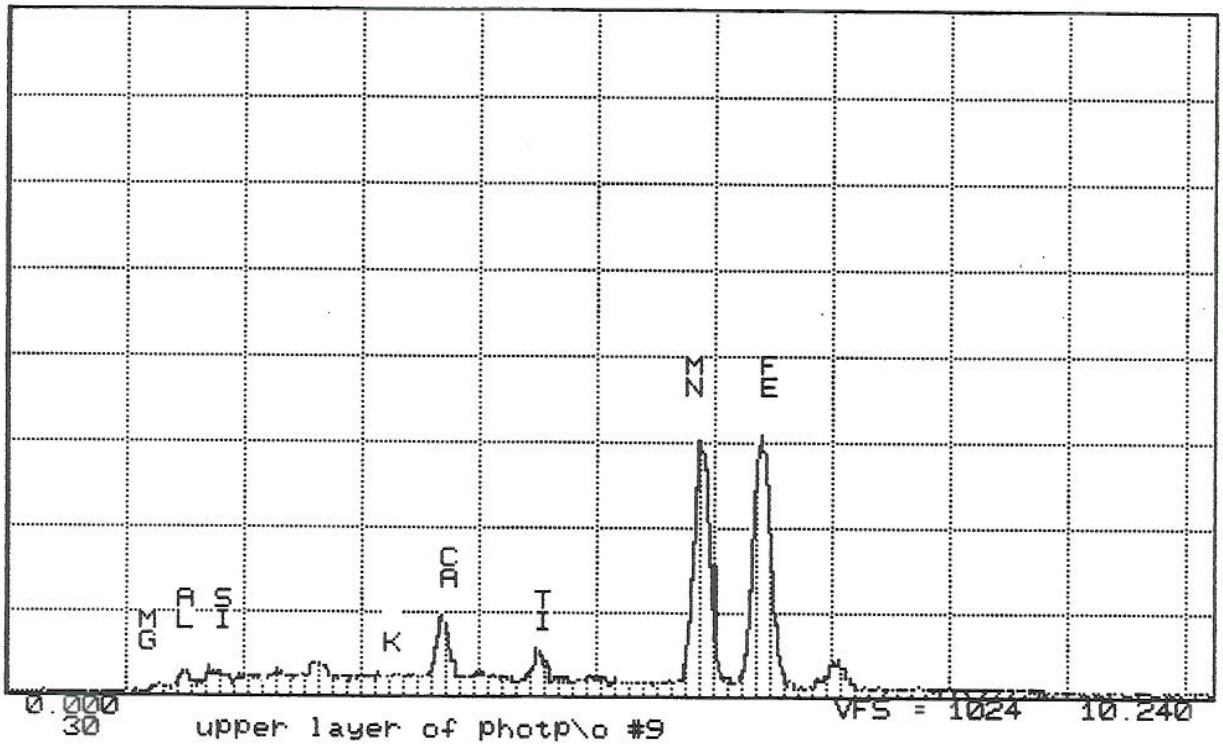

D-8

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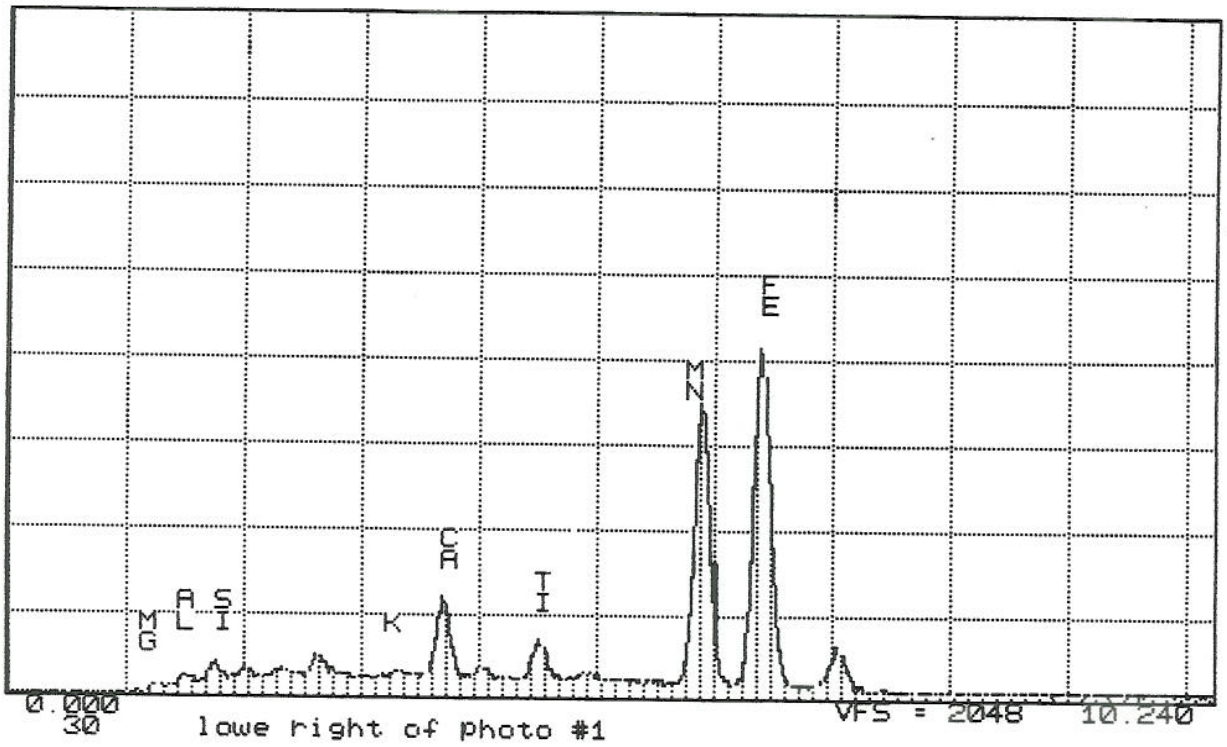

D8
LS-82-SP