

Appendix 1



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PETROGRAPHIC AND MINERAGRAPHIC DESCRIPTIONS

BRIEF PETROGRAPHIC DESCRIPTIONS

SAMPLE NO: MCPTS 2013 001

LOCATION: McArthur River, NT.

TYPE: RC Chips - MN 1 328 m

FIELD IDENTIFICATION: Finely bedded carbonaceous argillite containing finely disseminated sulphides. Zn – 9400 ppm.

SECTION TYPE: Polished Thin Section

DESCRIPTION:

Quartz (detrital)	18%	Opagues (1%):
Carbonaceous material	66%	Sphalerite - tr
Carbonate - ankerite	4%	Pyrite - dominant
Clay	10%	Chalcopyrite - tr
Opagues	1%	

The fine grained matrix is largely dark under transmitted light. Fine (40 to 70 μm), detrital quartz clasts occur in the clay dusted and carbonaceous matrix. Finer grained units are apparent as clayey horizons that locally occur as sedimentary breccia clasts due to syn-sedimentary slumping. A series of cloudy carbonate veins have penetrated the matrix and cross-cut relict bedding.

In reflected light, fine (50 μm), anhedral, Fe poor sphalerite and chalcopyrite blebs occur in the matrix that contains finely disseminated pyrite. Fine dispersed pyrite can occur as a selvage to the clayey units. Fine grained sphalerite has been remobilised along the cross-cutting carbonate stringers.

Comments: Relict bedding textures have been preserved in the carbonaceous argillite host. Fine syngenetic sulphides including sphalerite, chalcopyrite and pyrite are apparent, with sphalerite being locally remobilised in the carbonate stringers.

PIMA ANALYSIS: Kaolinite (weak), muscovite, ankerite.

CLASSIFICATION: *Fine grained syngenetic sulphides (sphalerite, chalcopyrite, pyrite) occur in a bedded carbonaceous argillite host that has been locally cross-cut by carbonate veins.*

SAMPLE NO: MCPTS 2013 002

LOCATION: McArthur River, NT.

TYPE: RC Chips - MN 1 335.5 m

FIELD IDENTIFICATION: Finely bedded carbonaceous and dusted carbonate units containing finely disseminated sulphides. The carbonate unit reacts very weakly with dilute HCl. Zn – 1.38%

SECTION TYPE: Polished Thin Section

DESCRIPTION:

Quartz	1%	Opagues (2%):
Carbonaceous material	57%	Tennantite - tr
Carbonate - ankerite	35%	Pyrite - dominant
Clay	5%	Chalcopyrite - tr
Opagues	2%	

Like Sample MCPTS 2013 001 the matrix of the strongly carbonaceous chip is very dark (to opaque) and the composition cannot be determined. The carbonate – rich chip comprises a clouded anhedral carbonate mosaic that locally cross-cuts the carbonaceous host. A coarser grained carbonate lens in the matrix is closely associated with interstitial secondary magnetite.

In reflected light, very fine grained (3 to 5 µm), anhedral to subhedral pyrite is dispersed through the carbonaceous argillite host as a syngenetic phase. The carbonate component contains interstitial magnetite as well as coarser grained sulphides including trace anhedral tennantite, anhedral chalcopyrite and anhedral to subhedral pyrite locally rimmed by chalcopyrite.

Comments: Relict bedding textures in one carbonaceous chip confirms a carbonaceous argillite host. Fine syngenetic sulphides – pyrite are dispersed the carbonaceous argillite. Carbonate has penetrated the matrix and is closely associated with magnetite and coarser grained remobilised sulphides including pyrite and chalcopyrite.

PIMA ANALYSIS: Ankerite.

CLASSIFICATION: *Fine grained syngenetic sulphides (pyrite) occur in a bedded carbonaceous argillite host. A portion of the argillite host that has been invaded by carbonate (ankerite) is associated with secondary magnetite, pyrite and chalcopyrite mineralisation.*

SAMPLE NO: MCPTS 2013 003

LOCATION: McArthur River, NT.

TYPE: RC Chips - MN 1 370 m

FIELD IDENTIFICATION: Finely bedded carbonaceous and argillite containing disseminated sulphides. Zn – 4100 ppm.

SECTION TYPE: Polished Thin Section

DESCRIPTION:

Quartz/chalcedony	4%	Opagues (2%):
Carbonaceous material	89%	Pyrite - dominant
Clay	5%	Sphalerite - tr
Opagues	2%	

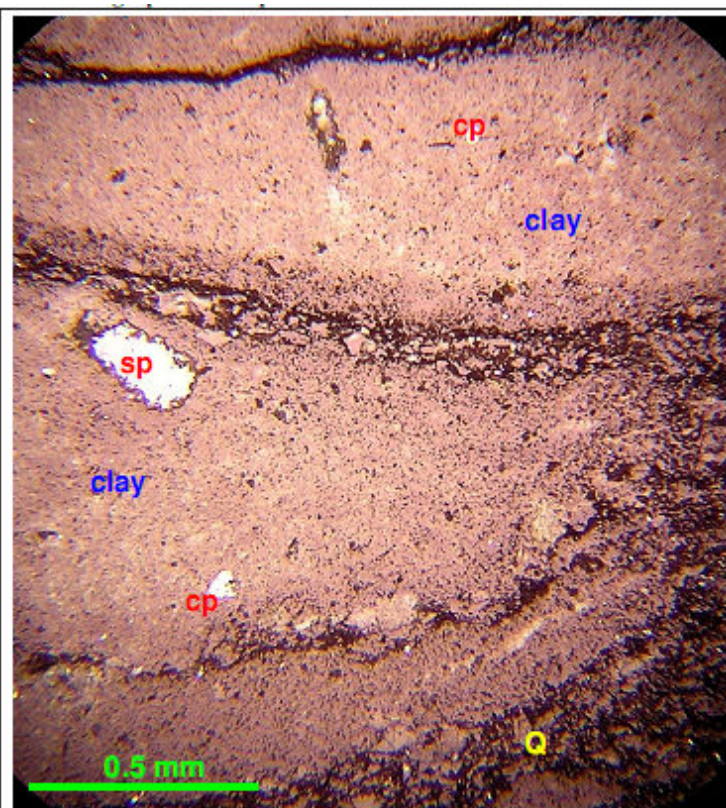
Like Samples MCPTS 2013 001 & 002 the matrix of the strongly carbonaceous chips are very dark (to opaque) and the composition of the host cannot be determined. The fine grained texture confirms a probable carbonaceous argillite host. Minor cavities have been infilled by chalcedonic aggregates clouded by limonite and containing euhedral casts after original sulphides.

In reflected light, very fine grained (3 to 7 µm), anhedral to subhedral pyrite and trace anhedral sphalerite are dispersed through the carbonaceous argillite host as a probably syngenetic phase. The chalcedonic – filled cavities in the matrix can be rimmed by fine pyrite aggregates. A thin ptigmatic vein contains a concentration of fine subhedral pyrite grains.

Comments: The dark fine grained chips represent a carbonaceous argillite that contains finely dispersed syngenetic sulphides – pyrite. There is some evidence of remobilisation of sulphides in ptigmatic veins.

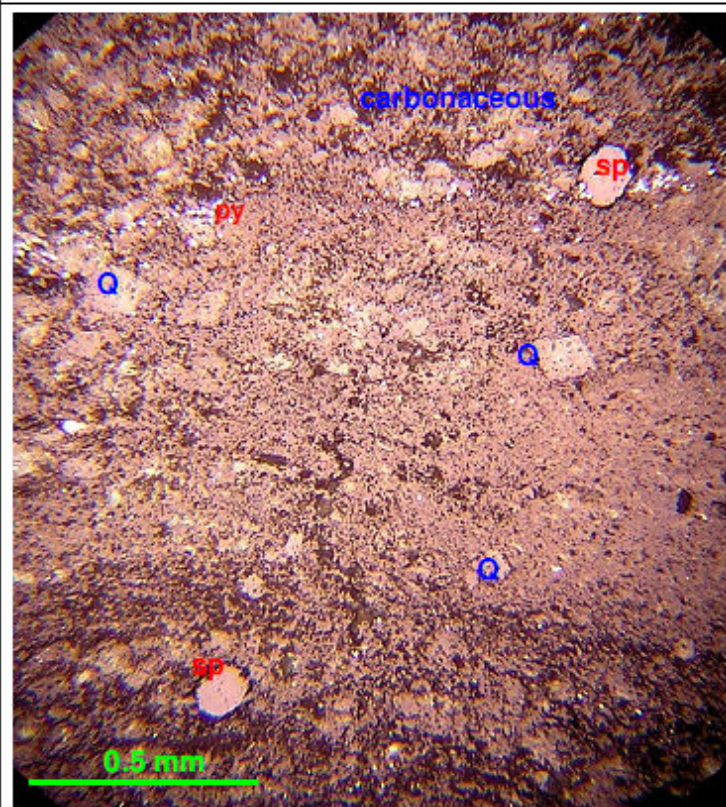
PIMA ANALYSIS: Kaolinite (weak).

CLASSIFICATION: *Fine grained syngenetic sulphides (pyrite) occur in a carbonaceous argillite host.*



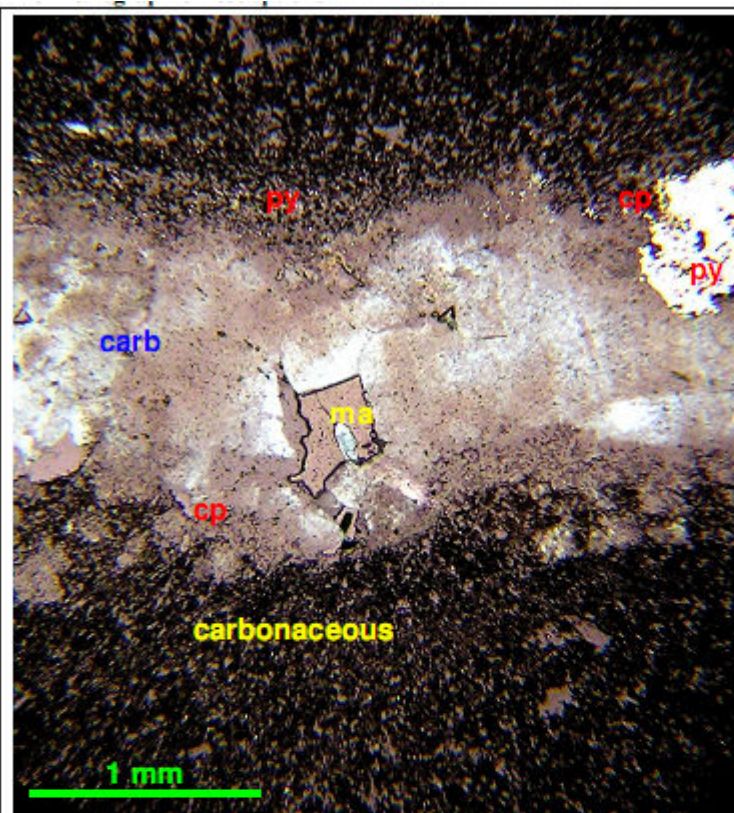
Sample MCPTS 2013 - 001

Fine blebby sphalerite (sp) and chalcopyrite (cp) occur in clayey lenses within the carbonaceous argillite host. Crossed polars under reflected and transmitted light. Field of view – 1.5 mm.



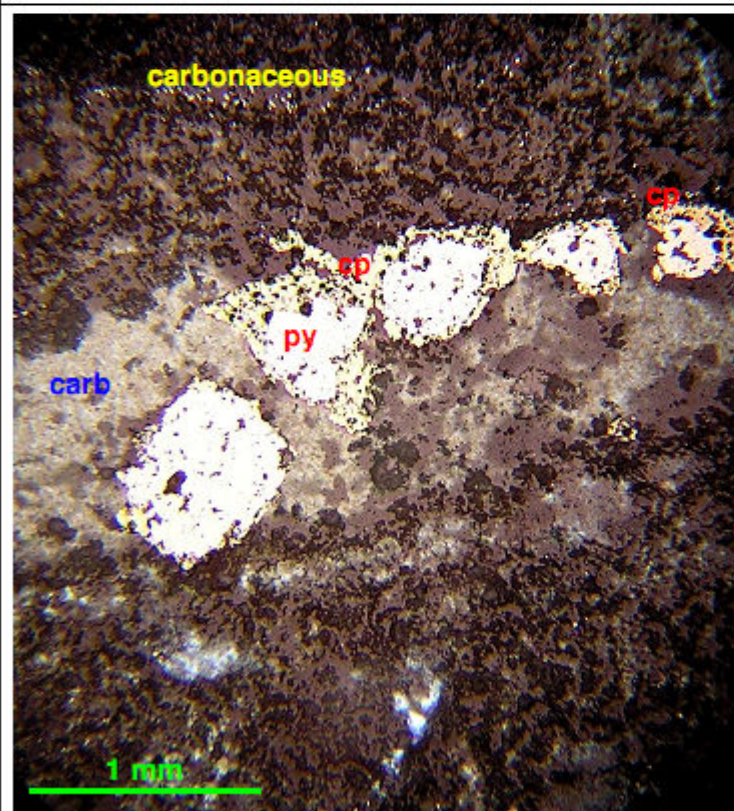
Sample MCPTS 2013 - 001

Another view showing blebby sphalerite (sp) occurring within the carbonaceous argillite host containing fine detrital quartz (Q). Fine grained pyrite (py) parallels relict bedding. Crossed polars under reflected and transmitted light. Field of view – 3 mm.



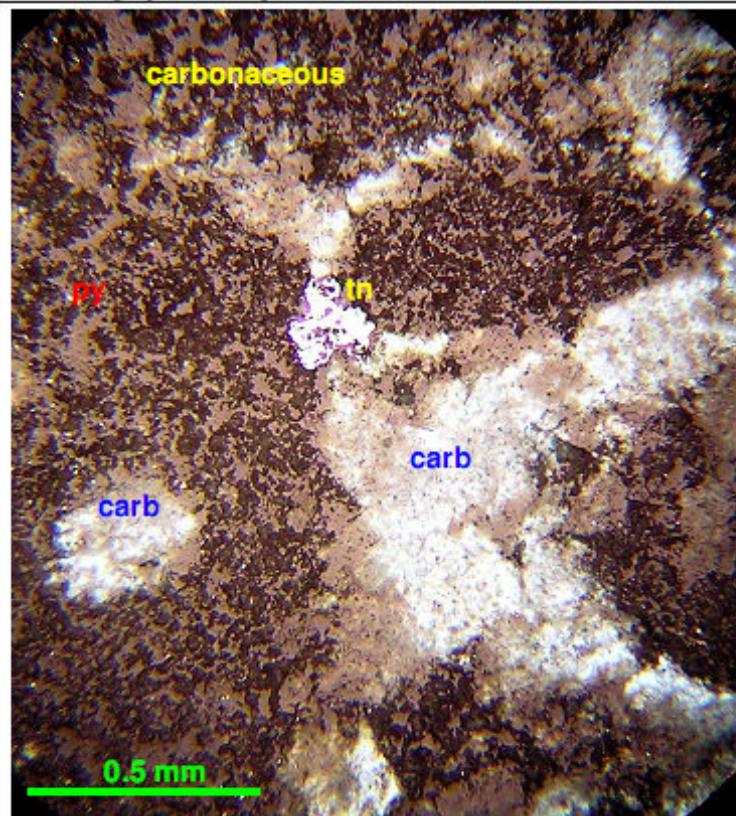
Sample MCPTS 2013 - 002

A carbonate lens cross-cuts the carbonaceous argillite host and is associated with minor interstitial magnetite and blebby pyrite (py) rimmed by chalcopyrite (cp). Fine pyrite (py) rims the carbonate lens. Crossed polars under reflected and transmitted light. Field of view – 3 mm.



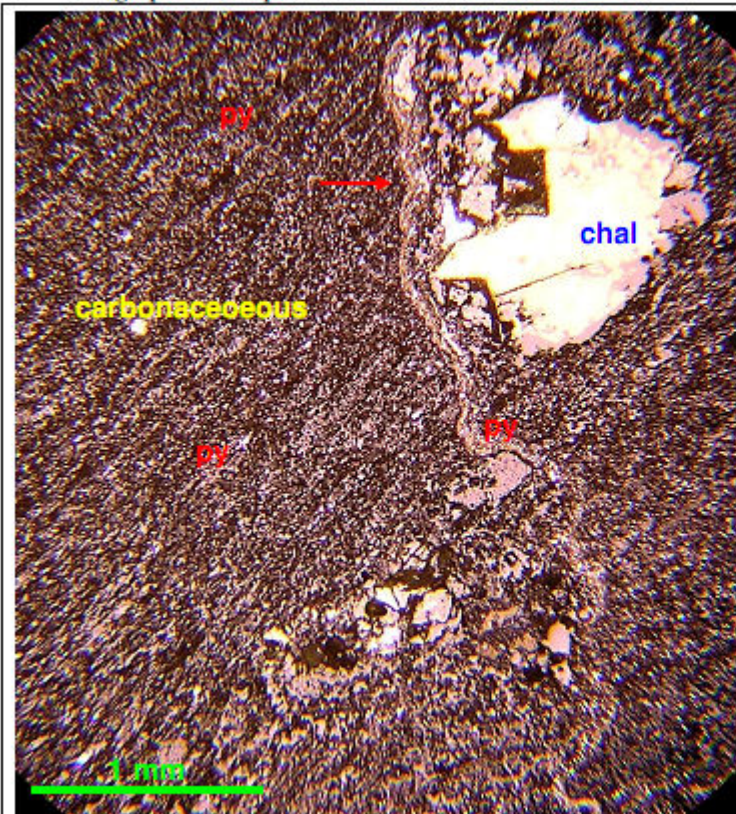
Sample MCPTS 2013 - 002

Another view showing chalcopyrite (cp) rimming pyrite (py) in a carbonate lens in the carbonaceous argillite host. Crossed polars under reflected and transmitted light. Field of view – 3 mm.



Sample MCPTS 2013 - 002

Anhedral tennantite (tn) associated with a carbonate (carb) vein that has penetrated the carbonaceous argillite host. Crossed polars under reflected and transmitted light. Field of view – 3 mm.



Sample MCPTS 2013 - 003

A euohedral cast, probably after pyrite, is associated with chalcedony (chal) in a cavity in the carbonaceous argillite host containing finely dispersed pyrite (py). A thin pygmatic vein (arrowed) has concentrated sulphides – pyrite. Crossed polars under reflected and transmitted light. Field of view – 3 mm.