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PETROGRAPHY OF TWELVE CORE SAMPLES FROM THE HYLAND GOLD PROPERTY (YUKON)

Report prepared for

Equity Exploration Consultants Ltd.
200 - 900 West Hastings Street
Vancouver, B.C.
V6C 1E5

By

Mineral Services Canada Inc.
205-930 Harbourside Drive
North Vancouver, B.C.
V7P 3S7

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PETROGRAPHY OF TWELVE CORE SAMPLES FROM THE HYLAND GOLD PROPERTY (YUKON)

1. INTRODUCTION

This report presents the results of petrographic analyses of twelve core samples received from Robin Black of Equity Exploration Consultants Ltd. Polished thin sections, off-cuts and hand samples were submitted. ICP and Au fire assay data were provided with the samples, but no detailed geologic or spatial information was received. The aim of the study was to characterize the mineralization and ore associations occurring in the samples as well as to address the specific questions outlined in Table 1. Note that MSC numbers 1 – 12 have been assigned to the samples for ease of reference.

Table 1: List of samples examined as part of this investigation.

MSC #	Sample Number	Thin Section	Polished Thin Section	Comments / queries received with samples
1	**HY10-559205** 75.92-76.0		YES	section perpendicular to sulphide veins
2	**HY10-559081** 49.10-49.13	YES		
3	**HY10-559214** 89.52-89.61		YES	sulphidic material
4	**HY10-559080** 42.73-42.80		YES	strongly oxidised
5	**HY10-559066** 23.5-23.65		YES	strongly oxidised
6	**HY10-559226** 105.15-105.25		YES	section perpendicular to sulphide veins; are pyrite and arsenopyrite co-genetic?
7	**HY10-559255** 143.36-143.45		YES	fine-grained, beige material -- What is it?
8	**HY10-559257** 146.0-146.4 A		YES	section area marked on core
9	**HY10-559257** 146.0-146.4 B		YES	section area marked on core
10	**HY10-559206** 76.6-76.7		YES	pyrite-arsenopyrite - characterize sulphides
11	**HY10-559212** 87.16-87.26		YES	discontinuous veins, sulphides
12	**HY04-14** 227m		YES	

2. METHODS

Petrographic descriptions were performed in the office of Mineral Services Canada Inc. using a Nikon Eclipse E400 microscope equipped with transmitted and reflected light. The microscopic characteristics of the samples are described in Appendix A and illustrated in a series of representative photomicrographs presented in Appendix B. All modal abundance percentages in the descriptions are approximate.

3. RESULTS

Three types of materials are represented in the samples examined for this study:

(i) Quartzite: samples 1, 3, 6, 7, 10 and 12

(ii) Oxidized material: samples 4 and 5

(iii) Metasedimentary rocks: samples 2, 8, 9 and 11.

The microscopic characteristics of the samples are described in Appendix A (also included as an Excel file - Hyland.xls) and are illustrated in a series of representative photomicrographs presented in Appendix B. The main characteristics of the samples are described below.

3.1. QUARTZITE SAMPLES

Mineralization is variable between the samples. Sulphide abundance is lowest in samples 6 and 10 (~15%), moderate in samples 1 and 7 (25%) and highest in samples 3 and 12 (~85% and ~65%). Native gold is present in sample 1 where it occurs in trace amounts.

Mineralization typically occurs in veins that are variable in thickness (few millimetres to semi-massive at the scale of the thin section), variably well-defined and made up of sulphides ± quartz (± carbonate). Sulphides are less commonly disseminated in the quartz groundmass.

In all but one of the samples (sample 1), pyrite is the dominant sulphide and is typically fine or fine and medium grained and anhedral to subhedral (rarely euhedral). Pyrite forms granular aggregates in samples 3, 10 and 12. In two of these samples (10 and 12), the pyrite is intergrown with arsenopyrite and additionally occurs as disseminated grains not associated with arsenopyrite. In samples 6 and 7, pyrite occurs in cross-cutting veins with quartz and/or carbonate, and additionally occurs disseminated in the quartz groundmass. The abundance of arsenopyrite in the pyrite-dominated samples is generally low, ranging from trace amounts in sample 3 to 3-5% in samples 6, 7, 10, but reaches 25% in sample 12. Arsenopyrite in these samples is typically fine or fine to medium grained and anhedral to subhedral. It is intergrown with pyrite in aggregates and cross-cutting veins in samples 3, 7, 10 and 11, and occurs disseminated in samples 6, 10 and 12.

Sulphides in sample 1 are dominated by fine grained, subhedral to euhedral arsenopyrite (20%) that forms aggregates locally associated with pyrite (2-3%) and disrupted locally by titanite filled fractures. The pyrite occurs as small inclusions and masses enclosed within arsenopyrite.

Chalcopyrite occurs in four of the samples as very fine grained inclusions in pyrite and/or arsenopyrite (samples 1, 3 and 6), as interstitial infill along pyrite ± arsenopyrite grain boundaries and fractures (samples 1, 3 and 12), and as sporadic lining on pyrite grains in a cross-cutting quartz-pyrite vein (sample 6). It is mostly a minor component (trace or 1-3%) but makes up 18% of sample 3.

Pyrite, arsenopyrite and chalcopyrite additionally occur together as very fine grained anhedral grains associated with carbonate in a cross-cutting vein in sample 7.

Trace pyrrhotite occurs as very fine grained inclusions in arsenopyrite in sample 1.

Minor (1-2%) sphalerite is present in sample 3 as small inclusions in pyrite and as interstitial infill along pyrite grain boundaries and fractures where it is associated with chalcopyrite and less commonly with bismuthinite. Trace sphalerite is present in sample 6 as sporadic lining on pyrite and in sample 12 as interstitial infill to pyrite, typically associated with chalcopyrite or tetrahedrite.

Tetrahedrite is the only sulphosalt present. In sample 1 it variably occurs (1%) as inclusions in pyrite and arsenopyrite (locally associated with chalcopyrite and pyrite inclusions), and is also intergrown with bismuthinite. In sample 12, tetrahedrite (5%) is interstitial to pyrite and arsenopyrite, fills fractures, and is locally associated with chalcopyrite.

Bismuthinite occurs in sample 1 as rare inclusions in arsenopyrite, and is typically intergrown with tetrahedrite. It is also observed in sample 3 as interstitial infill along pyrite grain boundaries and fractures, where it is typically associated with chalcopyrite and sporadically with sphalerite. It also occurs as small inclusions in pyrite.

Native gold is present in sample 1 as eight small (5-35 microns) grains and is likely genetically associated with pyrite, based on its occurrence along pyrite-arsenopyrite grain boundaries and as inclusions in pyrite.

The groundmass around sulphides is dominated by extensively strained quartz (typically 60-75% of the samples, except in samples 3 and 12 which are extensively mineralized and consist of less than 20% quartz). Quartz occurs predominantly as fine to medium grained, anhedral and commonly elongate, interlocking internally deformed grains mantled by microcrystalline recrystallized grains and suggests a quartzite host rock (either as metamorphosed quartz vein or metamorphosed sandstone). Very fine and fine grained anhedral to acicular tourmaline is disseminated as small aggregates and interstitial to quartz in all samples. Samples 6, 7 and 10 also contain trace amounts of disseminated coarser-grained anhedral to subhedral tourmaline. Tourmaline is typically weakly coloured, except when disseminated in the groundmass (possible detrital grains). Topaz occurs in samples 1, 3 and 6 as anhedral grains scattered in the quartz groundmass. Titanite is present in four of the samples, as fracture filling (sample 1), as disseminated clusters (sample 3), rimming carbonate in a cross-cutting veinlet (sample 6) and disseminated in a carbonate vein (sample 7). Trace sericite and epidote are present in samples 1 and 12, respectively. Rutile is observed in samples 3, 6, 7, 10 and 12 (trace to 1%) as very fine grained anhedral grains and granular clusters disseminated in the quartz groundmass, typically associated with tourmaline.

In most samples (1, 3, 7, 12) the quartz groundmass is cut by thin sulphide ± quartz (± carbonate) veins in which quartz is typically fine-grained, homogeneous in size and undeformed.

Carbonate is present in four of the samples: trace amounts occur disseminated and in veins fracturing sulphides in sample 3, as a veinlet cutting sample 6 and as patches or filling fractures in sulphides in sample 12; yellow-brown carbonate (probably Fe-bearing) associated with quartz and sulphides forms a discontinuous vein and makes up 2-3% of sample 7.

3.2. OXIDIZED SAMPLES

Two of the samples consist of quartz aggregates disseminated in an opaque groundmass. In sample 4, aggregates of fine grained anhedral deformed quartz and disseminated possible sericite make up 7% of the sample. In sample 5 aggregates of quartz and tourmaline make up 30% of the sample. The gangue aggregates in both samples are fractured with cavities and fractures lined by possible jarosite.

Fe- and possible (Fe-Mn)-oxyhydroxides form the opaque groundmass of both thin sections, making up 85% and 70% of samples 4 and 5, respectively. They occur as anhedral to amorphous masses after unknown minerals, locally displaying a dentritic pattern and filling fractures. Hematite is intergrown with possible (Fe-Mn)-oxyhydroxides and pseudomorphs probable pyrite in sample 4. Trace amounts of relict pyrite are observed.

3.3. METASEDIMENTARY ROCK SAMPLES

These samples consist of a variety of metasedimentary rock types including quartz-muscovite schist (sample 2) and possible metagraywacke (sample 11). Samples 8 and 9 are banded, more complex and encompass several rock types at the scale of the thin sections. Except for sample 2, all samples contain minor amounts of quartz veining and associated mineralization.

Sample 2 is comprised of quartz-muscovite schist that is unveined and unmineralized. Muscovite makes up 45% of the sample and is very fine grained to microcrystalline and intergrown with lesser quartz. Titanite and tourmaline are disseminated in the quartz-muscovite schist groundmass.

In sample 11, the quartz grain size and abundance of muscovite and disseminated rutile, titanite and tourmaline define a thin mineralogical banding (possible bedding). Quartz is typically anhedral and muscovite defines thin ribbons wrapping around the quartz grains. In the more muscovite-rich bands, quartz and muscovite are typically very fine-grained and intergrown.

Samples 8 and 9 consist of banded metasediments that are disrupted by quartz-sulphide veins. Bands are made up of quartz-muscovite and/or quartz-tourmaline and/or internally deformed/recrystallized quartz (± tourmaline), the latter also occurring in possible wedges. In both samples, quartz-muscovite and quartz-tourmaline bands are very fine-grained to microcrystalline and dominated by muscovite and/or tourmaline. The internally deformed/recrystallized quartz (± tourmaline) bands and wedges are typically coarser-grained.

In samples 8, 9 and 11, quartz additionally occurs as fine grained anhedral grains forming veins with tourmaline ± sulphides. Tourmaline forms granular aggregates and is interstitial to quartz in veins.

Pyrite is the dominant sulphide, making up 25%, 30% and 10% of samples 8, 9 and 11, respectively. Very fine to medium grained typically subhedral grains form aggregates or are disseminated in quartz veins and also occur disseminated in the host rock.

Galena (5%) is interstitial to pyrite in sample 8. In sample 11, chalcopyrite (5%) is interstitial to pyrite and quartz in veins. Minor (1%) arsenopyrite is present in sample 8 (as inclusions in pyrite) and samples 9 and 11 (locally intergrown with pyrite).

Rutile is observed in samples 8, 9 and 11 as very fine grained anhedral grains and granular clusters disseminated in the host rock, being most abundant (5%) in sample 8.

Fine grained interlocking carbonate (including possible calcite) forms cross-cutting veins hosting fine-grained pyrite and makes up 10% of sample 9. Trace very fine grained granular calcite is disseminated in quartz-sulphide veins in sample 11.

3. SUMMARY AND CONCLUSION

The results of petrographic analyses of twelve core samples are presented in this report. The purpose of the study was to characterize the mineralization and ore associations occurring in the samples as well as to address certain specific questions. The main conclusions are summarized below.

- Six samples are recognized as mineralized quartzite samples. Quartz forming the groundmass occurs as anhedral and commonly elongate, internally deformed grains and microcrystalline recrystallized grains. Quartz is weakly or undeformed in cross-cutting veins. Tourmaline occurs as disseminated grains, small aggregates and ribbons interstitial to quartz.
- Carbonate is present in six of the samples and likely constitutes the beige material observed in the hand specimen of sample 7. Carbonate (forming veins) is most abundant in sample 9.
- The quartzite samples are variably mineralized (15% to 85%). Primary mineralization comprises pyrite, arsenopyrite and chalcopyrite, with minor sphalerite, tetrahedrite and rare trace pyrrhotite. Bismuthinite occurs in samples 1 and 3 and native gold in sample 1.
- Pyrite typically forms granular aggregates in cross-cutting veins or massive aggregates and is less commonly disseminated.
- Arsenopyrite is typically intergrown with pyrite in aggregates or occurs disseminated.
- Chalcopyrite is interstitial to pyrite and/or arsenopyrite and fills fractures or forms inclusions in these minerals.
- Sphalerite is interstitial to pyrite, and associated with chalcopyrite and bismuthinite, or forms inclusions in pyrite.
- Tetrahedrite occurs as inclusions in pyrite and arsenopyrite or is interstitial to these minerals. It is intergrown with bismuthinite or associated with chalcopyrite.
- Bismuthinite is interstitial to pyrite, and typically associated with chalcopyrite, or forms inclusions in pyrite or arsenopyrite, intergrown with tetrahedrite.
- Pyrite (granular aggregates in veins) and arsenopyrite (disseminated in the groundmass) in sample 6 are likely not co-genetic.
- Native gold occurs in sample 1 (eight 5-35 micron grains) and is likely genetically associated with pyrite as suggested by its occurrence as inclusions in pyrite and at pyrite/arsenopyrite grain boundaries.
- Two samples are strongly oxidized and consist of quartz ± tourmaline ± muscovite aggregates disseminated in an opaque groundmass made up of Fe- and possible (Fe-Mn)-oxyhydroxides. Rare remnant pyrite is observed in one sample.

- Four samples consist of variably veined and mineralized metasedimentary rocks (including schist and metagraywacke). Mineralization in three of these samples comprises mainly pyrite as granular aggregates or disseminated grains, lesser galena and chalcopyrite interstitial to pyrite (one sample only), and minor arsenopyrite as inclusions or intergrown with pyrite.

Geology reported by:
Alexandra Mauler-Steinmann, Ph. D., P. Geo.

Report reviewed by:
Tom Nowicki, Ph. D., P. Geo.

Digitally signed by Alexandra Mauler-Steinmann
Date: 2011.02.16 11:06:32 -08'00'

APPENDIX A: SAMPLE DESCRIPTIONS

A.1. QUARTZITE SAMPLES

Sample	Sample Type	Gangue mineralogy	Gangue texture	Sulphides/oxides mineralogy	Pyrite texture	Arsenopyrite texture
1 (205)	Quartzite	Quartz (65%) Tourmaline (5-7%) Titanite (3%) Sericite (tr) Topaz (tr)	Groundmass consists essentially of fine to medium grained anhedral and commonly elongate interlocking internally deformed quartz grains, and lesser microcrystalline recrystallized quartz grains; tourmaline occurs disseminated as small aggregates and interstitial to quartz; a few grains of topaz are locally associated with tourmaline; one vein of unstrained quartz that is lined by tourmaline cross-cuts the quartz groundmass. Sulphides are disseminated in the quartz groundmass but mostly occur in subparallel veins that cut the quartz vein and are lined by very fine grained tourmaline; titanite occurs filling oxidized fractures disrupting sulphides; sericite sheaves occur within fractures in sulphides.	Arsenopyrite (20%) Pyrite (2-3%) Chalcopyrite (1%) Tetrahedrite (1%) Pyrrhotite (tr) Bismuthinite (tr) Native gold (tr)	Locally microfractured fine grained anhedral grains and aggregates occur enclosed within arsenopyrite; small inclusions in arsenopyrite	Locally microfractured fine grained subhedral to euhedral grains form aggregates; disrupted locally by titanite-filled fractures
3 (214)	Quartzite	Quartz (12%) Tourmaline (3%) Carbonate (tr) Topaz (tr) Titanite (tr)	Groundmass interstitial to massive and disseminated sulphides consists essentially of fine grained anhedral and locally elongate interlocking internally deformed quartz grains, and lesser microcrystalline recrystallized quartz grains; tourmaline occurs disseminated as small aggregates or interstitial to quartz; titanite clusters and anhedral grains of topaz are scattered throughout the quartz groundmass; carbonate occurs disseminated and in veins fracturing sulphides.	Pyrite (60%) Chalcopyrite (18%) Arsenopyrite (tr) Bismuthinite (5%) Sphalerite (1-2%) Rutile (tr)	Locally microfractured fine grained anhedral to subhedral grains form clusters and massive aggregates	Very fine grained subhedral to euhedral grains occur intergrown with pyrite and as inclusions in chalcopyrite
6 (226)	Quartzite	Quartz (70%) Tourmaline (15%) Topaz (tr) Carbonate (tr) Titanite (tr)	Groundmass consists essentially of fine and medium grained anhedral and commonly elongate interlocking internally deformed quartz grains and lesser microcrystalline recrystallized quartz grains; very fine and fine grained tourmaline occurs as disseminated grains, small aggregates and ribbons lining quartz grains and aggregates; two discontinuous quartz-pyrite veins cross-cut the groundmass; fine to very fine grained carbonate (possible calcite) forms a thin veinlet oriented nearly perpendicular to the quartz-pyrite veins; the coarser-grained carbonate grains are commonly coated by a rim of possible titanite.	Pyrite (10%) Arsenopyrite (3-4%) Chalcopyrite (tr) Sphalerite (tr) Rutile (tr)	Locally microfractured fine and medium grained anhedral to subhedral grains in veins; minor very fine and fine grained anhedral to euhedral grains are disseminated	Fine grained anhedral to euhedral grains are disseminated, commonly in clusters and typically associated with tourmaline
7 (255)	Quartzite	Quartz (60%) Tourmaline (10%) Carbonate (2-3%) Titanite (tr) Epidote (tr)	Groundmass consists essentially of fine and medium grained anhedral internally deformed quartz grains that are rimmed by mantles of microcrystalline recrystallized quartz grains (core and mantle texture); very fine grained, anhedral to euhedral tourmaline forms aggregates or is disseminated in the groundmass. Several types of veins cut the samples: i) ill-defined, subparallel discontinuous veins of fine to medium grained sulphides; ii) subparallel fine grained, undeformed quartz (± sulphide) veins that disrupt the coarser-grained sulphide veins; iii) a carbonate-sulphide vein that cuts all previously described veins; the latter consists of fine grained interlocking yellow-brown (possibly Fe-bearing) carbonate, disseminated quartz grains, rock (schist) fragments and very fine-grained sulphides; carbonate in the vein is commonly coated by a possible rim of titanite; a few grains of epidote also occur in the quartz groundmass.	Pyrite (20%) Arsenopyrite (5%) Rutile (tr) Chalcopyrite (tr)	Microfractured medium grained subhedral grains are locally intergrown with arsenopyrite in type (i) veins, or occur disseminated in the groundmass; very fine anhedral grains are disseminated in carbonate vein (iii)	Fine grained anhedral to subhedral grains occur intergrown with pyrite in type (i) veins; very fine grained anhedral grains are disseminated in carbonate vein (iii)
10 (206)	Quartzite	Quartz (75%) Tourmaline (8-10%)	Groundmass consists essentially of fine and medium grained anhedral and commonly elongate interlocking internally deformed quartz grains, and lesser interstitial microcrystalline recrystallized quartz grains; very fine grained tourmaline occurs as disseminated grains, small aggregates and ribbons in the groundmass but mostly forms aggregates along fractures.	Pyrite (10%) Arsenopyrite (5%) Rutile (1%)	Locally microfractured fine and medium grained subhedral grains occur intergrown with arsenopyrite in aggregates (possible discontinuous veins) and as rare disseminated grains	Locally microfractured fine and medium grained anhedral to subhedral grains occur intergrown with pyrite in aggregates and as rare disseminated grains
12 (14)	Quartzite	Quartz (20%) Tourmaline (10%) Epidote (tr) Carbonate (tr)	Sample consists of semi-massive sulphides with interstitial quartz that is either fine grained, undeformed and homogeneous in size (possible ill-defined veins) or medium grained, anhedral or elongate and mantled by microcrystalline quartz grains (possible host rock); very fine grained tourmaline occurs disseminated as small aggregates or interstitial to quartz; very fine grained subhedral epidote is disseminated; carbonate forms patches and fills fractures in sulphides.	Pyrite (35%) Arsenopyrite (25%) Chalcopyrite (2-3%) Tetrahedrite (5%) Rutile (tr) Sphalerite (tr)	Locally microfractured fine and medium grained anhedral to euhedral grains intergrown with arsenopyrite form large granular aggregates; very fine grained subhedral to euhedral disseminated grains not associated with arsenopyrite	Locally microfractured fine and medium grained anhedral to subhedral grains intergrown with pyrite form large semi-massive granular aggregates; very fine grained subhedral disseminated grains not associated with pyrite; small inclusions in pyrite

Sample	Sample Type	Chalcopyrite texture	Pyrrhotite texture	Sphalerite texture	Galena texture	Tetrahedrite texture	Bismuthinite texture
1 (205)	Quartzite	Very fine grained inclusions in arsenopyrite and pyrite, commonly associated with tetrahedrite; locally interstitial to arsenopyrite or filling fractures	Very fine grained inclusions in arsenopyrite	n/a	n/a	Very fine grained anhedral to subhedral inclusions in arsenopyrite and pyrite; associated with chalcopyrite and pyrite inclusions in arsenopyrite; intergrown with bismuthinite	Rare very fine grained inclusions in arsenopyrite, typically intergrown with tetrahedrite
3 (214)	Quartzite	Interstitial infill along pyrite grain boundaries and fractures, and locally interstitial to quartz; very fine grained inclusions in pyrite	n/a	Small anhedral to subhedral inclusions in pyrite and interstitial to pyrite, associated with chalcopyrite and less commonly with bismuthinite	n/a	n/a	Interstitial infill along pyrite grain boundaries and fractures, typically associated with chalcopyrite; small subhedral inclusions in pyrite and sporadically associated with sphalerite
6 (226)	Quartzite	Sporadic lining on pyrite grains in one of the quartz-pyrite veins and very rare inclusion in disseminated arsenopyrite	n/a	Sporadic lining on pyrite grains in one of the quartz-pyrite veins	n/a	n/a	n/a
7 (255)	Quartzite	Very fine grained anhedral grains are disseminated in carbonate vein (iii)	n/a	n/a	n/a	n/a	n/a
10 (206)	Quartzite	n/a	n/a	n/a	n/a	n/a	n/a
12 (14)	Quartzite	Interstitial to pyrite and arsenopyrite and filling fractures, locally associated with tetrahedrite	n/a	Interstitial to pyrite, typically associated with chalcopyrite or tetrahedrite	n/a	Interstitial to pyrite and arsenopyrite and filling fractures, locally associated with chalcopyrite	n/a

Sample	Sample Type	Fe- and (Fe-Mn)-oxyhydroxides	Rutile texture	Native gold texture
1 (205)	Quartzite	n/a	n/a	Eight small (5-35 microns) native gold grains occur at arsenopyrite - pyrite grain boundaries or as inclusions in pyrite, therefore likely genetically associated with pyrite
3 (214)	Quartzite	n/a	Very fine grained anhedral grains and granular clusters disseminated in the groundmass, typically associated with tourmaline	n/a
6 (226)	Quartzite	n/a	Very fine grained anhedral grains and granular clusters disseminated in the groundmass, typically associated with tourmaline	n/a
7 (255)	Quartzite	n/a	Very fine grained subhedral to anhedral grains and granular clusters disseminated in the groundmass, typically associated with tourmaline and disseminated in carbonate vein	n/a
10 (206)	Quartzite	n/a	Very fine grained anhedral grains and granular clusters disseminated in the groundmass, typically associated with tourmaline	n/a
12 (14)	Quartzite	n/a	Very fine grained anhedral grains and granular clusters disseminated in the groundmass, typically associated with tourmaline	n/a

A.2. OXIDIZED SAMPLES

Sample	Sample Type	Gangue mineralogy	Gangue texture	Sulphides/oxides mineralogy	Pyrite texture	Arsenopyrite texture
4 (080)	Strongly oxidised	Quartz (5%) Sericite? (2-3%) Jarosite? (1-2%)	Aggregates of fine grained anhedral internally deformed quartz grains and disseminated small sheaves and ribbons of possible sericite are fractured and disseminated in an opaque groundmass; radiating aggregates of possible jarosite occur lining cavities and fractures and also form disseminated patches.	(Fe-Mn)-oxyhydroxides (85%) Hematite (4-5%) Pyrite (tr)	Subhedral to euhedral fine and medium grained pseudomorphs replaced by hematite and (Fe-Mn)-oxyhydroxides with minor remnant pyrite.	n/a
5 (066)	Strongly oxidised	Quartz (15%) Tourmaline (12%) Jarosite? (1-2%)	Aggregates of fine grained anhedral internally deformed quartz grains and subhedral to euhedral tourmaline (disseminated or as massive aggregates) are fractured and disseminated in an opaque groundmass; radiating aggregates of possible jarosite occur lining cavities and fractures.	(Fe-Mn)-oxyhydroxides (70%) Rutile (1%)	n/a	n/a

Sample	Sample Type	Chalcopyrite texture	Pyrrhotite texture	Sphalerite texture	Galena texture	Tetrahedrite texture
4 (080)	Strongly oxidised	n/a	n/a	n/a	n/a	n/a
5 (066)	Strongly oxidised	n/a	n/a	n/a	n/a	n/a

Sample	Sample Type	Bismuthinite texture	Fe- and (Fe-Mn)-oxyhydroxides	Rutile texture	Native gold texture
4 (080)	Strongly oxidised	n/a	Fe- and possible (Fe-Mn)-oxyhydroxides form the opaque groundmass of the sample, occurring as anhedral masses after unknown minerals and displaying a 'dendritic' texture; hematite intergrown with possible (Fe-Mn)-oxyhydroxides occurs pseudomorphing pyrite	n/a	n/a
5 (066)	Strongly oxidised	n/a	Fe- and possible (Fe-Mn)-oxyhydroxides form the opaque groundmass of the sample, occurring as anhedral to amorphous masses after unknown minerals and filling fractures	Very fine grained anhedral and irregular grains occur disseminated in quartz aggregates	n/a

A.3. METASEDIMENTARY ROCK SAMPLES

Sample	Sample Type	Gangue mineralogy	Gangue texture	Sulphides/oxides mineralogy	Pyrite texture	Arsenopyrite texture
2 (081)	Quartz-muscovite schist	Quartz (45%) Muscovite (45%) Titanite (9-10%) Tourmaline (tr)	Very fine grained anhedral quartz is intergrown with sheaves and ribbons of probable muscovite that are aligned and define the foliation. Very fine grained titanite clusters and rare tourmaline grains are disseminated.	n/a	n/a	n/a
8 (257A)	Metasediments + quartz-sulphide veins	Quartz (40%) Tourmaline (20%) Muscovite (2-3%)	Sample consists of metasedimentary rock (~75%) cut by a 0.8 cm wide, splayed quartz-sulphide vein (~25%). On one side of the vein, the host rock is banded and made up of alternate bands of foliated very fine grained quartz-tourmaline and coarser-grained internally deformed quartz lined by microcrystalline recrystallized quartz and ribbons of sericite. On the other side of the vein, quartz is anhedral, fine grained and mantled by interstitial recrystallized quartz and disseminated tourmaline.	Pyrite (25%) Galena (5%) Rutile (5%) Arsenopyrite (1%)	(i) Very fine to medium grained subhedral to euhedral grains with irregular boundaries forming aggregates in one massive vein and numerous thin splays; (ii) very fine grained subhedral typically highly irregular grains disseminated in the host rock.	Small inclusions in pyrite
9 (257B)	Metasediments + veins	Quartz (45-50%) Carbonate (10%) Tourmaline (10%)	Complex sample consists of banded metasedimentary rock and numerous cross-cutting quartz ± sulphide and carbonate ± sulphide veins. The host rock consists of alternate bands of laminated and foliated microcrystalline quartz + possible tourmaline and fine grained internally deformed and microcrystalline quartz grains, the latter also occurring in possible wedges.	Pyrite (30%) Arsenopyrite (tr) Rutile (tr)	(i) Locally microfractured fine and medium grained anhedral to euhedral grains in clusters and aggregates form cross-cutting veins variably associated with quartz and carbonate; (ii) Very fine to medium grained subhedral to euhedral grains are disseminated in the host rock.	Fine grained anhedral to subhedral grains are locally intergrown with pyrite in cross-cutting veins
11 (212)	Metagraywacke + quartz-sulphide veins	Quartz (50%) Muscovite (30%) Tourmaline (1%) Titanite (tr) Calcite (tr)	Sample consists essentially of metasedimentary rock (85%) with minor (15%) quartz-sulphide veins. The host rock is banded and made up of alternate thin bands of muscovite-rich and muscovite-poor quartzite. Quartz occurs as fine to very fine grained anhedral grains mantled by ribbons of very fine grained muscovite. Variable amounts of rutile, titanite and tourmaline are disseminated and enhance the mineralogical banding. Two quartz ± sulphide veins cut the sample, one oblique and the other parallel to the host rock banding. Sheaves and ribbons of muscovite and very fine grained granular calcite and tourmaline are disseminated in veins.	Pyrite (10%) Chalcopyrite (5%) Rutile (2%) Arsenopyrite (1%)	(i) Fine and medium grained anhedral to euhedral grains forming aggregates or disseminated in quartz veins; and (ii) rare subhedral grains disseminated in the host rock.	Fine grained anhedral to subhedral grains locally intergrown with pyrite

Sample	Sample Type	Chalcopyrite texture	Pyrrhotite texture	Sphalerite texture	Galena texture	Tetrahedrite texture
2 (081)	Quartz-muscovite schist	n/a	n/a	n/a	n/a	n/a
8 (257A)	Metasediments + quartz-sulphide veins	n/a	n/a	n/a	Interstitial to pyrite	n/a
9 (257B)	Metasediments + veins	n/a	n/a	n/a	n/a	n/a
11 (212)	Metagraywacke + quartz-sulphide veins	Interstitial to pyrite and quartz in veins	n/a	n/a	n/a	n/a

Sample	Sample Type	Bismuthinite texture	Fe- and (Fe-Mn)-oxyhydroxides	Rutile texture	Native gold texture
2 (081)	Quartz-muscovite schist	n/a	n/a	n/a	n/a
8 (257A)	Metasediments + quartz-sulphide veins	n/a	n/a	Very fine grained anhedral disseminated grains and granular clusters in the host rock	n/a
9 (257B)	Metasediments + veins	n/a	n/a	Very fine grained anhedral grains and granular clusters disseminated in the host rock	n/a
11 (212)	Metagraywacke + quartz-sulphide veins	n/a	n/a	Very fine grained anhedral disseminated grains and granular clusters in the host rock	n/a

APPENDIX B: REPRESENTATIVE PHOTOMICROGRAPHS

List of abbreviations used in the description of photomicrographs:

FOV: Field of view – defined for the long dimension of photomicrographs
PPL: Plane polarized light
XPL: Crossed polars
RL: Reflected light

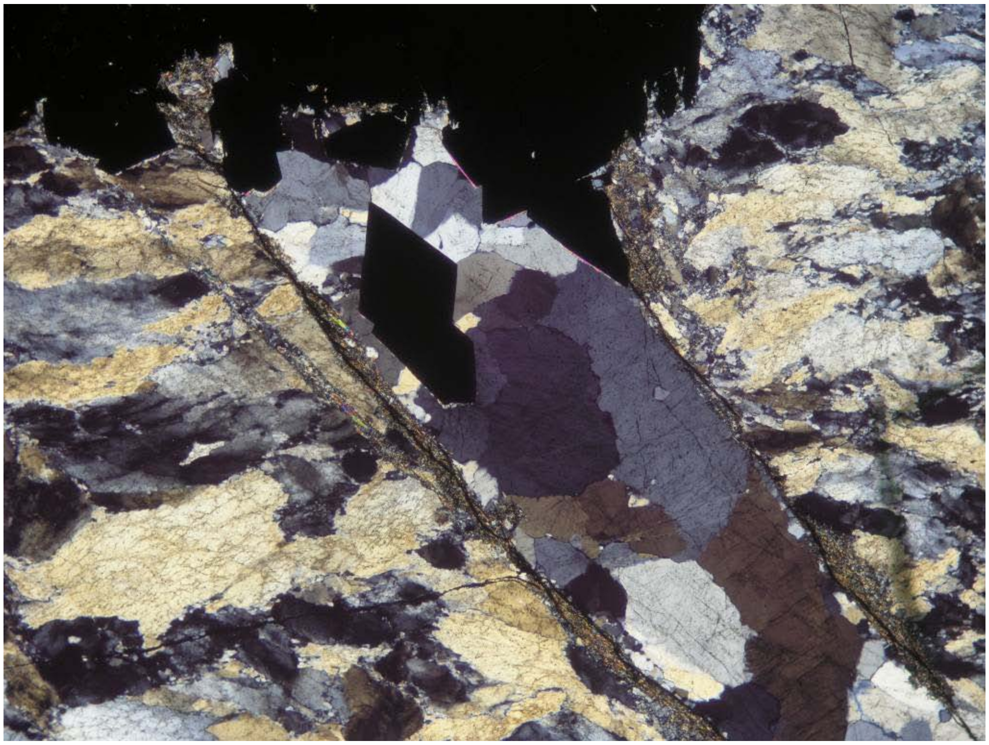

Figure 1: *Photomicrograph of sample 1 showing elongate strongly deformed quartz making up the groundmass and weakly to undeformed quartz in a vein with sulphides. XPL, FOV = ~ 7 mm.*

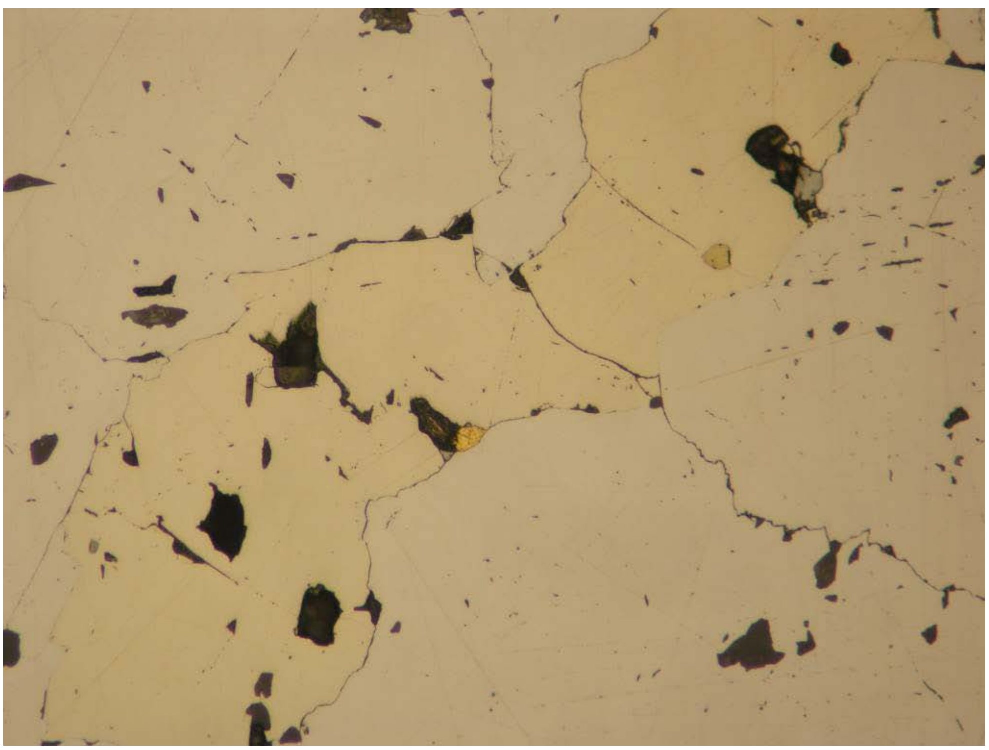

Figure 2: *Photomicrograph of sample 1 showing anhedral pyrite enclosed within arsenopyrite and a native gold grain (brassy yellow) located at a pyrite-arsenopyrite grain boundary. A chalcopyrite (yellow) inclusion is also present in pyrite. RL, FOV = ~ 0.7 mm.*

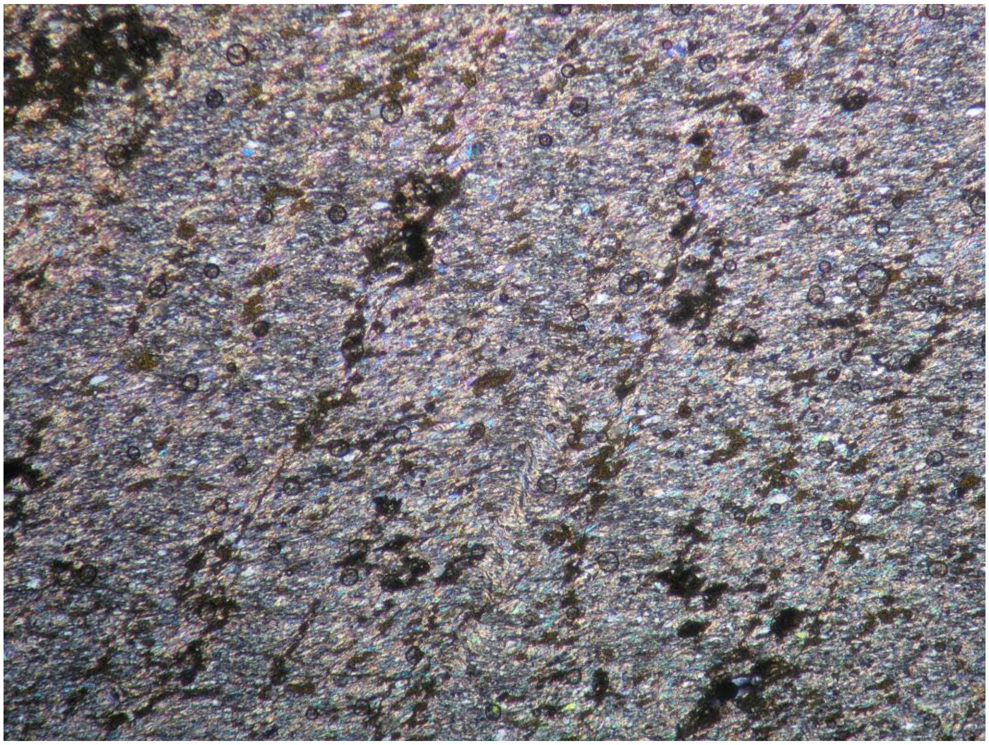

Figure 3: *Photomicrograph of sample 2 showing the texture of the quartz- muscovite schist made up of quartz, muscovite and disseminated titanite. XPL, FOV = ~ 2.7 mm.*

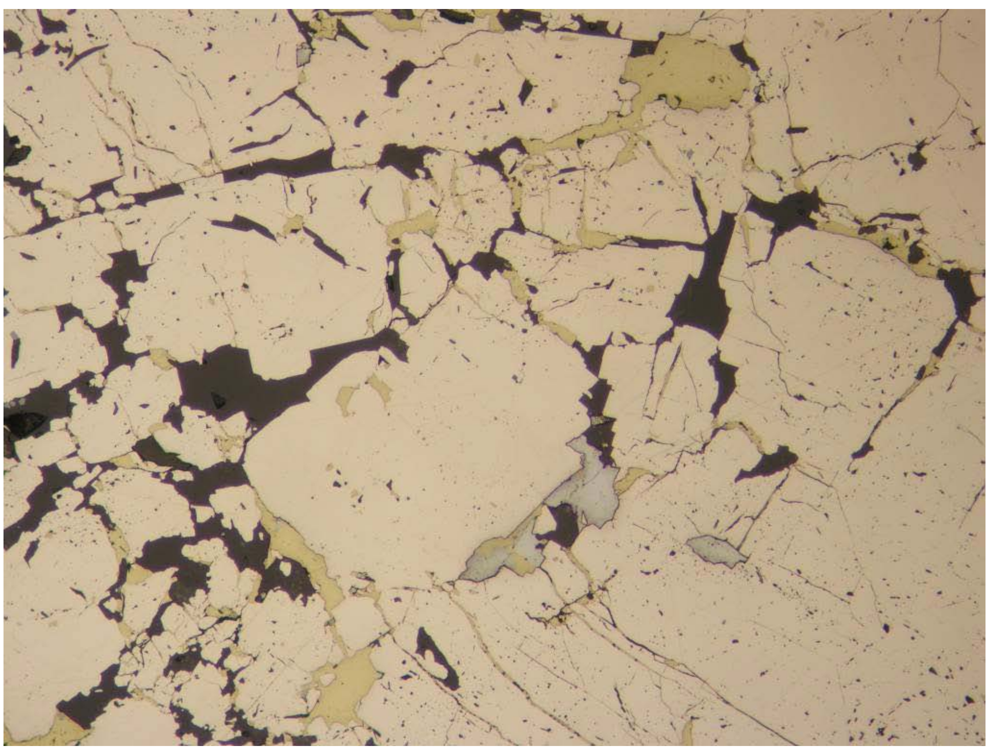

Figure 4: *Photomicrograph of sample 3 showing a granular aggregate of pyrite with interstitial chalcopyrite (yellow) and bismuthinite (grey). RL, FOV = ~ 1.4 mm.*

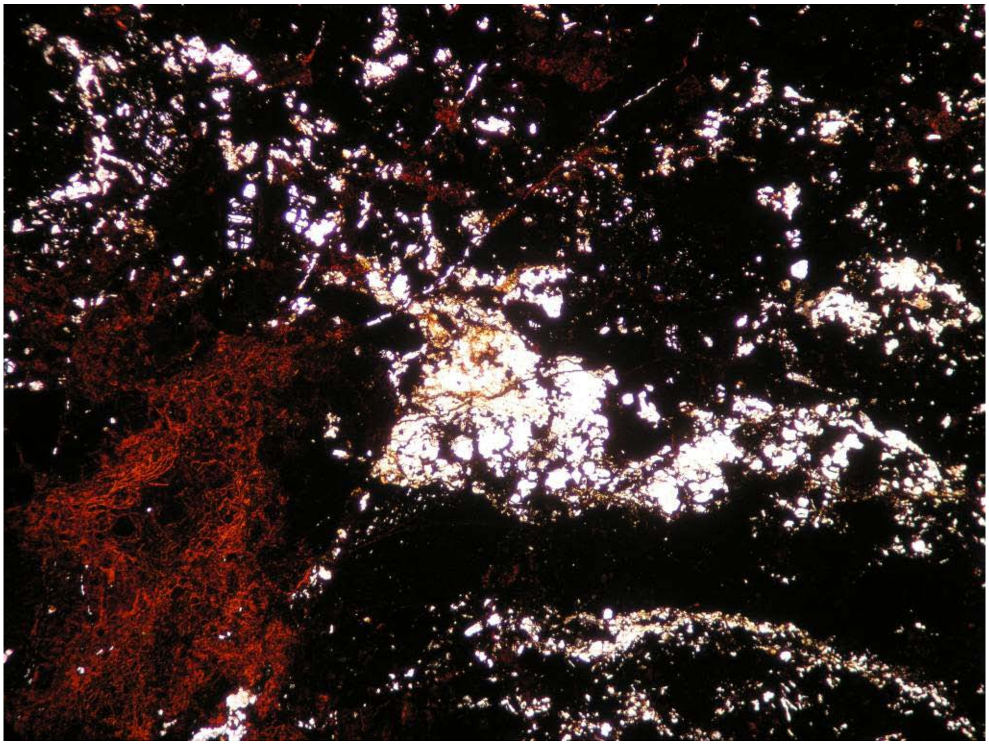

Figure 5: *Photomicrograph of sample 4 showing that it essentially consists of quartz aggregates (white) disseminated in a groundmass of hematite and (Fe-Mn)-oxyhydroxides. PPL, FOV = ~ 2.7 mm.*

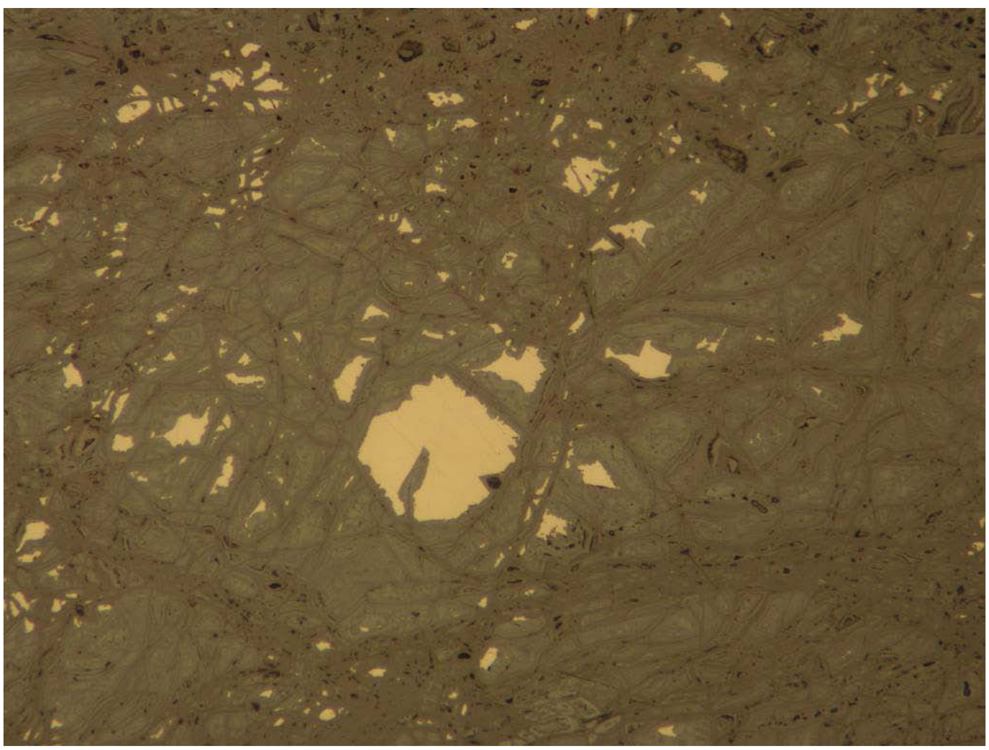

Figure 6: *Photomicrograph of sample 4 showing minor remnant pyrite that is predominantly replaced by hematite and (Fe-Mn)-oxyhydroxides. RL, FOV = ~ 0.7 mm.*

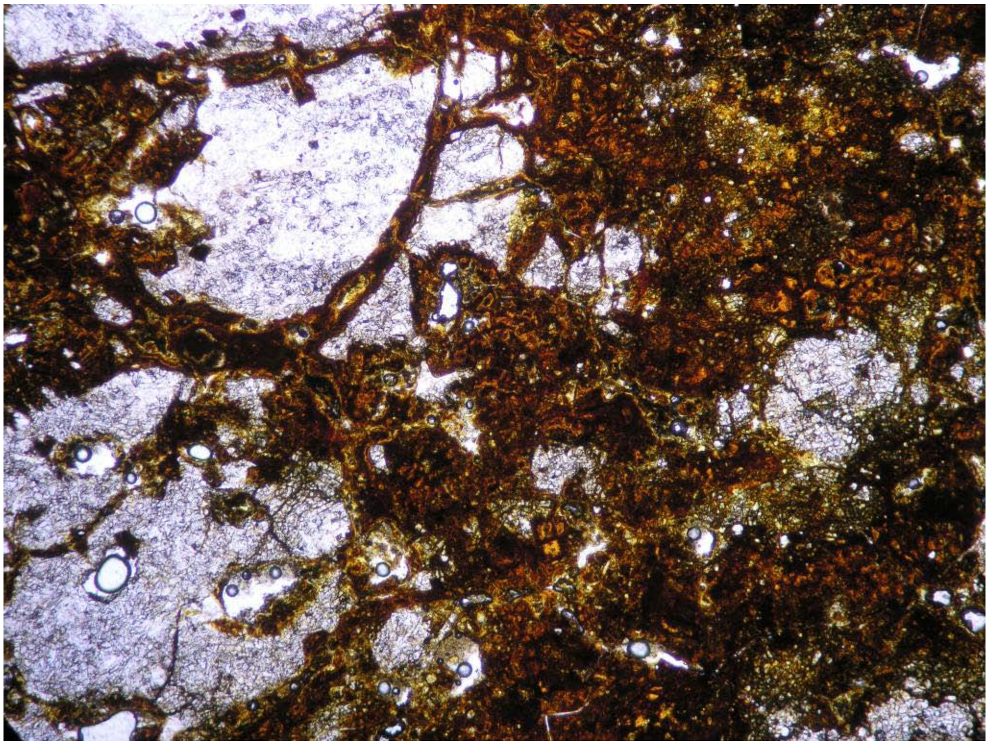

Figure 7: *Photomicrograph of sample 5 showing that it essentially consists of fractured quartz and tourmaline aggregates (white) disseminated in a groundmass of (Fe-Mn)-oxyhydroxides. PPL, FOV = ~ 2.7 mm.*

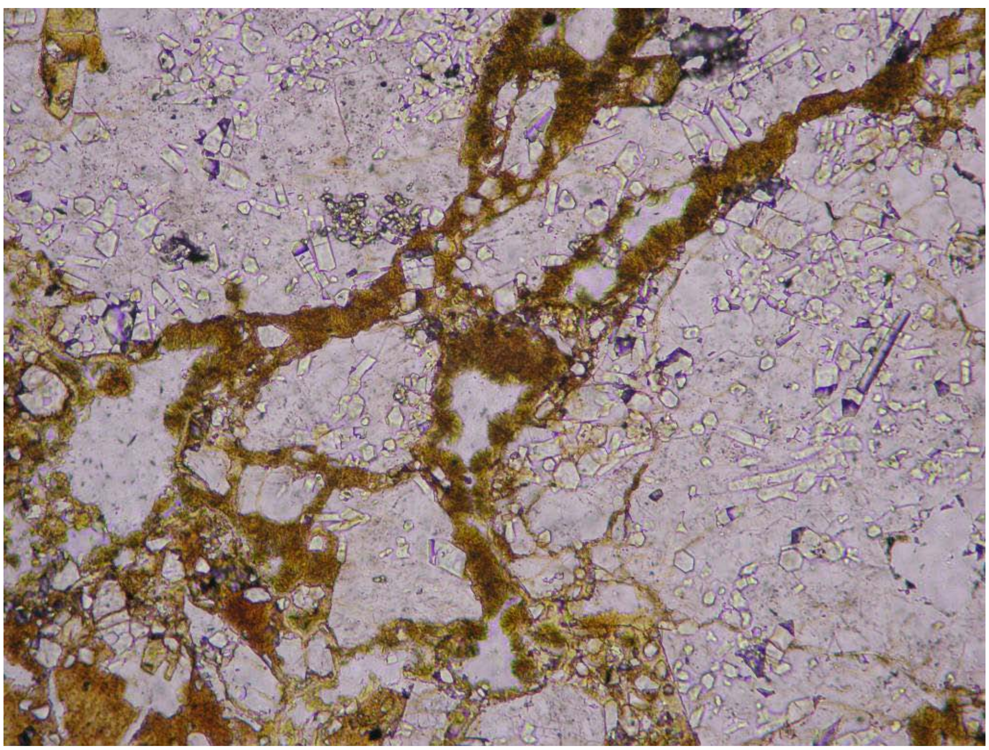

Figure 8: *Photomicrograph of sample 5 showing possible jarosite lining fractures and cavities in aggregates of quartz and tourmaline. PPL, FOV = ~ 0.7 mm.*

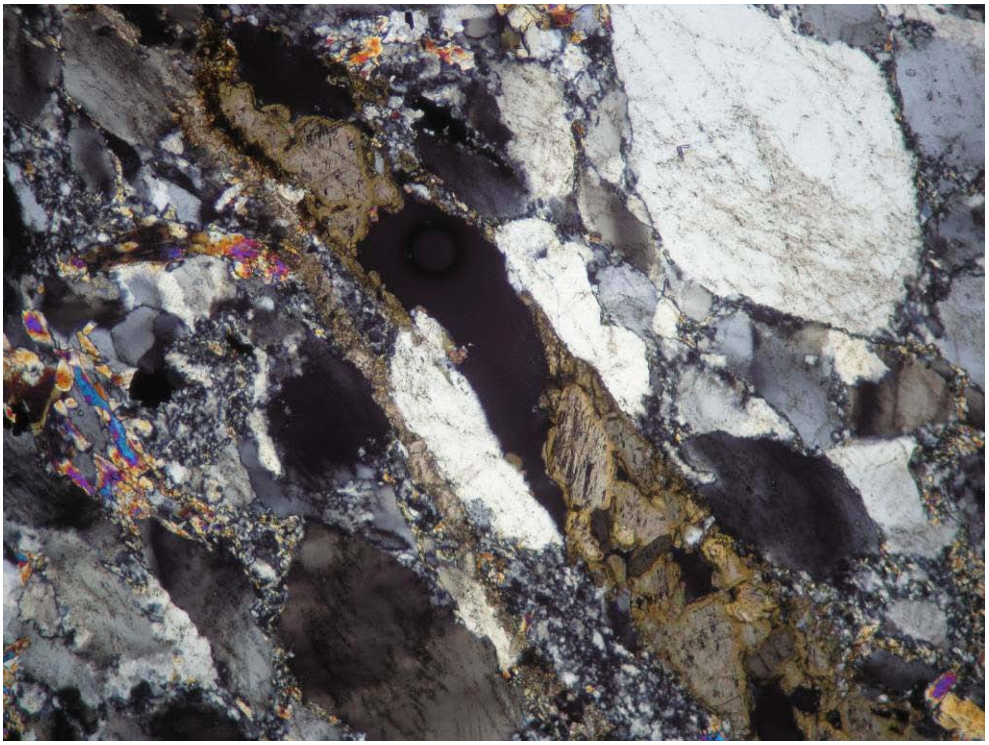

Figure 9: *Photomicrograph of sample 6 showing tourmaline (high birefringence) interstitial to quartz in the groundmass and a thin carbonate vein. Note the thin yellowish possible titanite rims on carbonate grains. XPL, FOV = ~ 2.7 mm.*

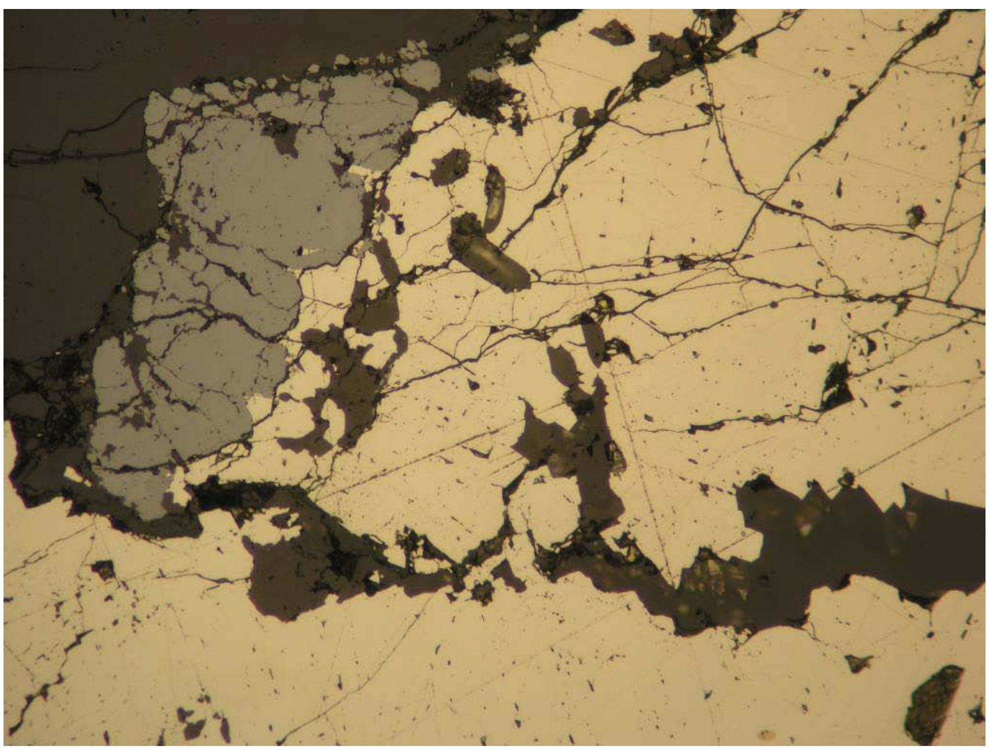

Figure 10: *Photomicrograph of sample 6 showing sphalerite (grey) lining microfractured pyrite (pale yellow) in a vein. RL, FOV = ~ 0.7 mm.*

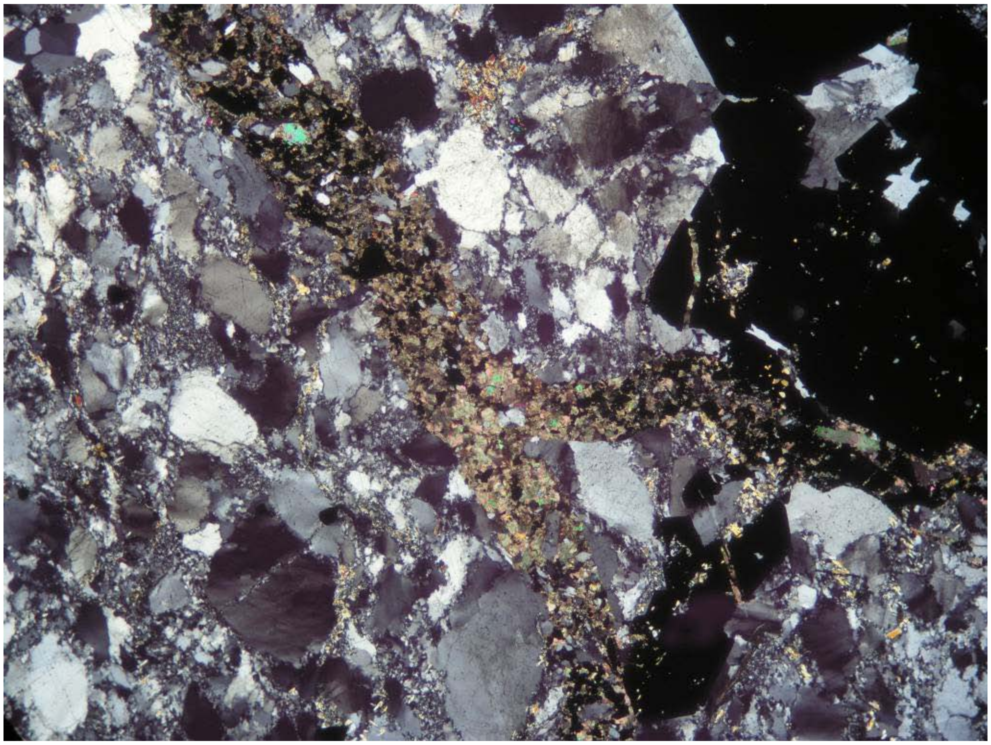

Figure 11: *Photomicrograph of sample 7 showing a thin carbonate-sulphide vein cutting the quartz groundmass and a quartz-sulphide vein. XPL, FOV = ~ 7 mm.*

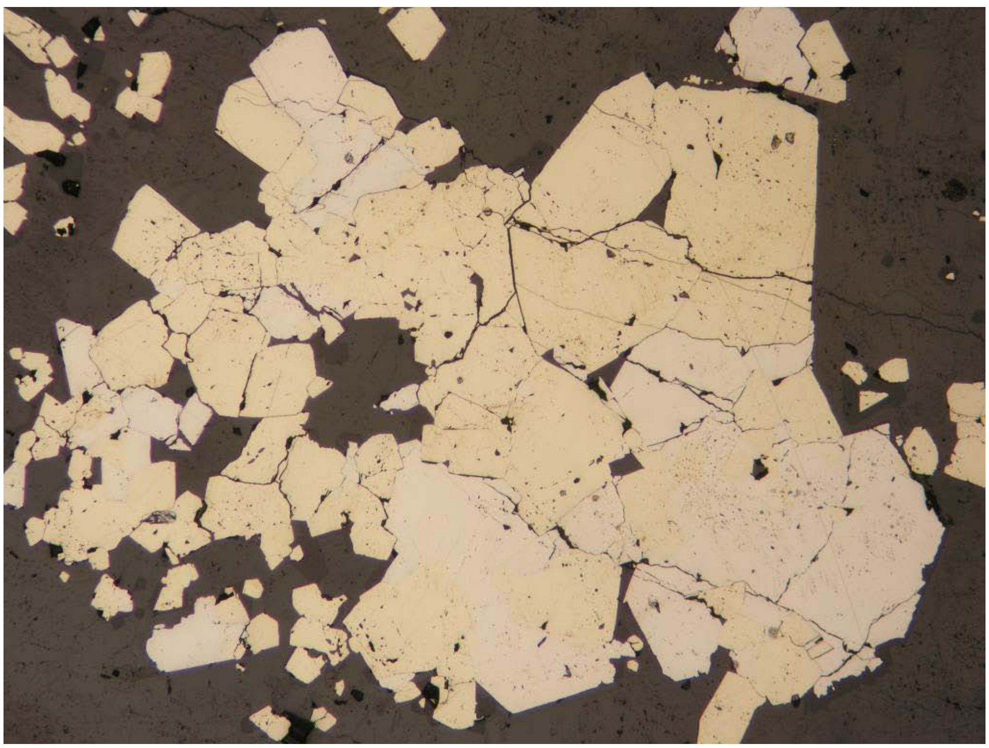

Figure 12: *Photomicrograph of sample 7 showing pyrite (pale yellow) intergrown with arsenopyrite (off-white) forming aggregates in a vein. RL, FOV = ~ 2.7 mm.*

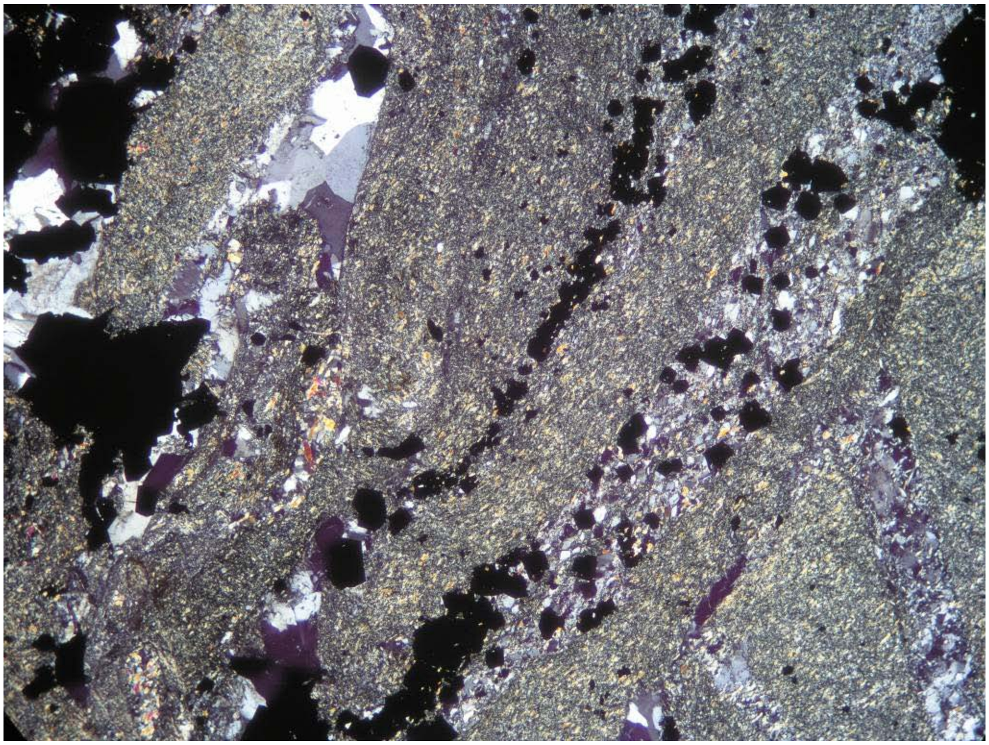

Figure 13: *Photomicrograph of sample 8 showing numerous quartz-pyrite veinlets cutting the quartz-tourmaline metasedimentary host rock. XPL, FOV = ~ 7 mm.*

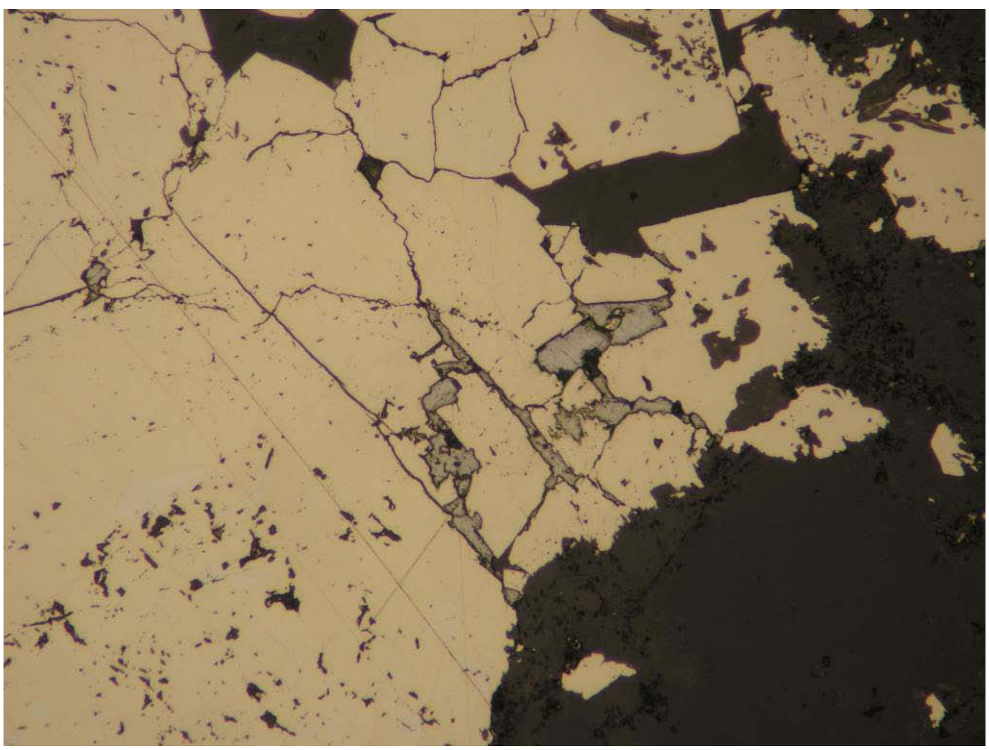

Figure 14: *Photomicrograph of sample 8 showing a massive vein of pyrite (pale yellow) with small arsenopyrite inclusions (white, lower left) and interstitial galena (grey). RL, FOV = ~ 0.7 mm.*

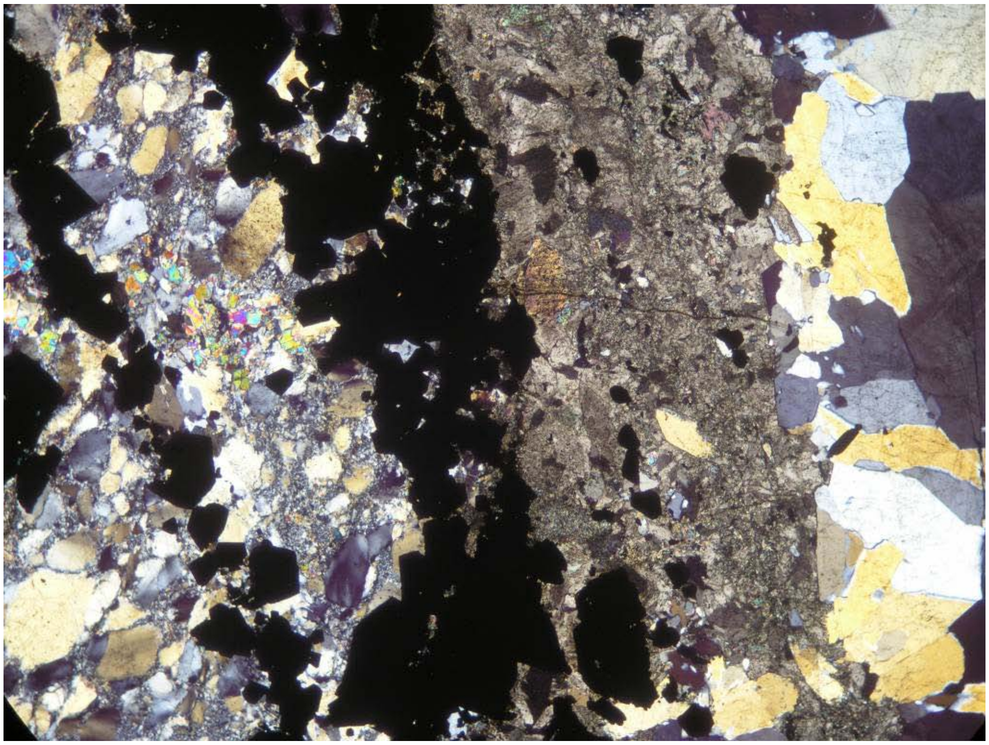

Figure 15: *Photomicrograph of sample 9 showing veinlets of quartz (right), carbonate (right centre) and sulphides (left centre) cutting the metasedimentary host rock (left; coarser-grained internally deformed/ recrystallized quartz ± tourmaline band). XPL, FOV = ~ 7 mm.*

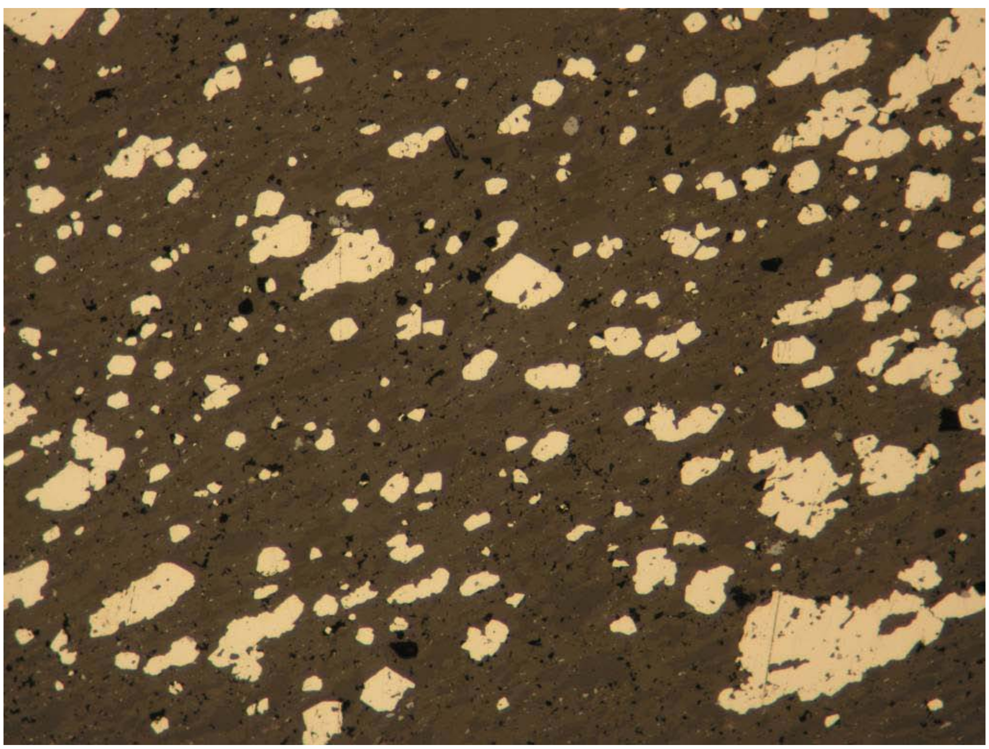

Figure 16: *Photomicrograph of sample 9 showing very fine grained anhedral to subhedral, commonly irregular pyrite disseminated in a quartz-tourmaline band of the metasedimentary host rock. RL, FOV = ~ 1.4 mm.*

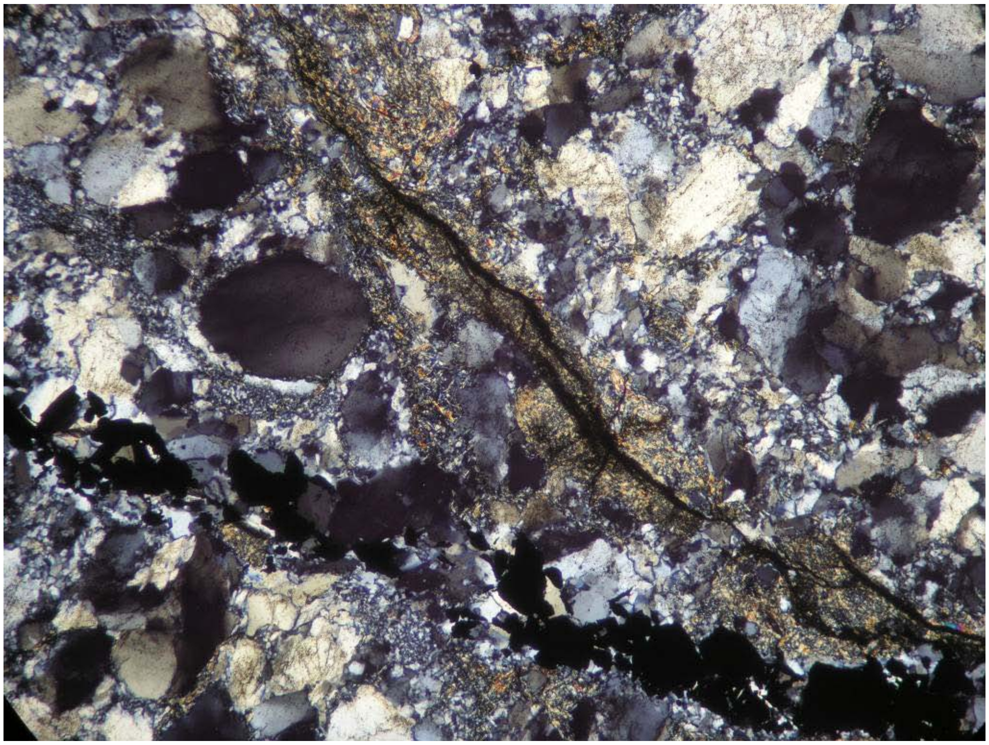

Figure 17: *Photomicrograph of sample 10 showing aggregates of tourmaline along fractures in the quartz groundmass and a quartz-sulphide vein. XPL, FOV = ~ 2.7 mm.*

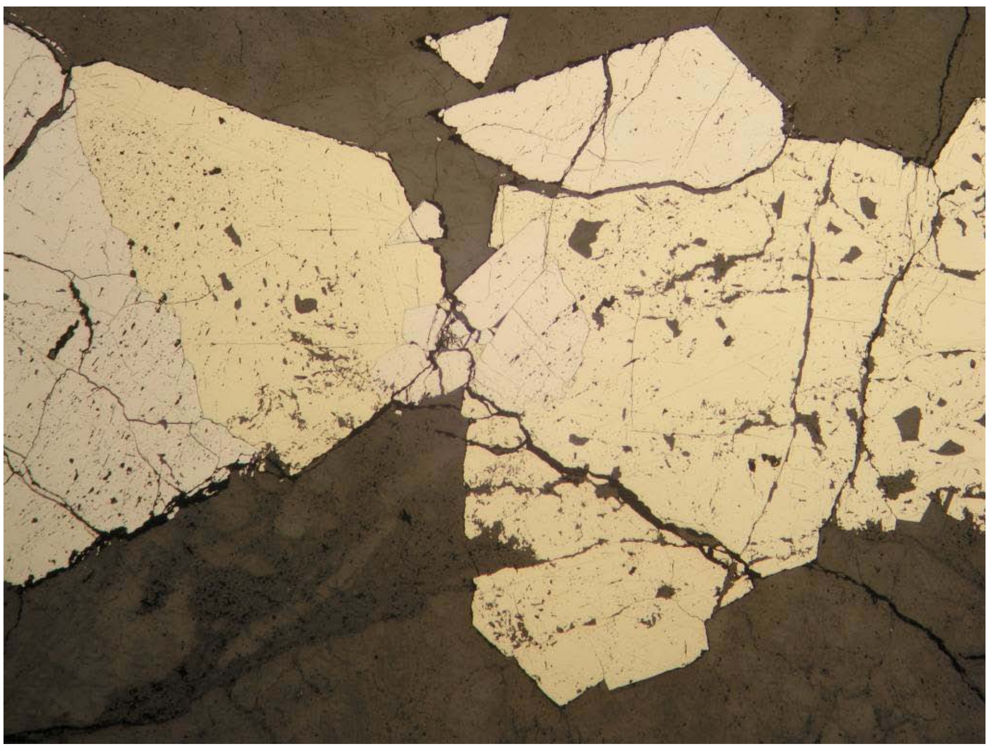

Figure 18: *Photomicrograph of sample 10 showing fine and medium grained pyrite (pale yellow) intergrown with arsenopyrite (off-white). RL, FOV = ~ 7 mm.*

__Figure 19:__ Photomicrograph of sample 11 showing a quartz-sulphide veinlet cutting the quartz-muscovite host rock (possible metagraywacke). XPL, FOV = ~ 7 mm.

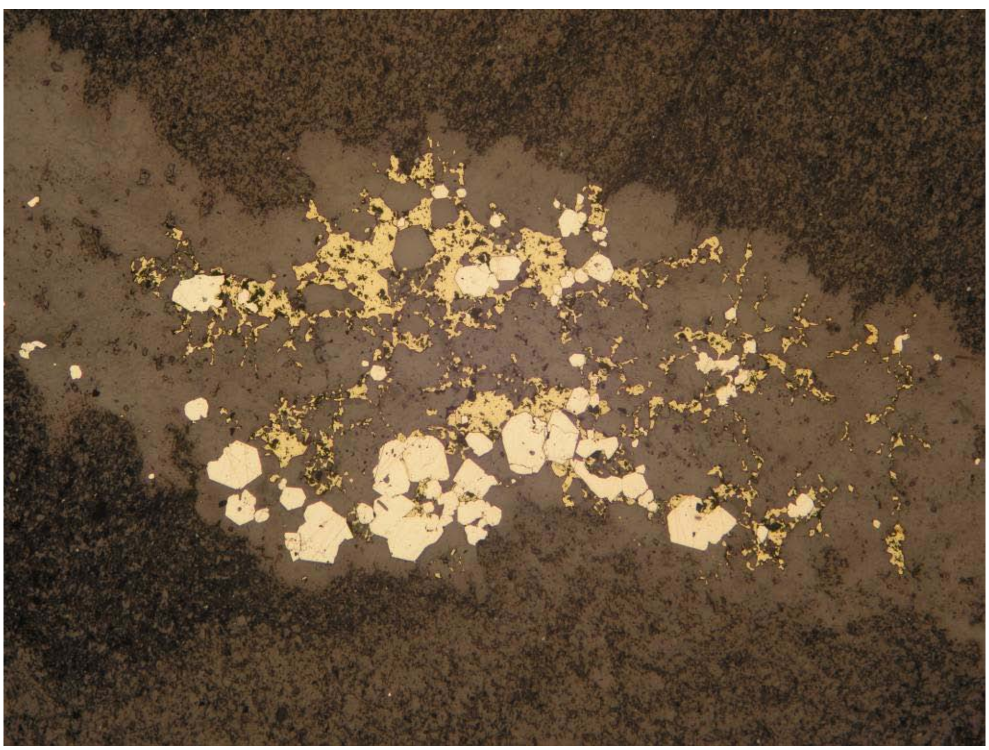

__Figure 20:__ Photomicrograph of the quartz-sulphide veinlet in Figure 19, showing subhedral to euhedral pyrite in clusters and disseminated, and chalcopyrite interstitial to pyrite and quartz. RL, FOV = ~ 6.5 mm.

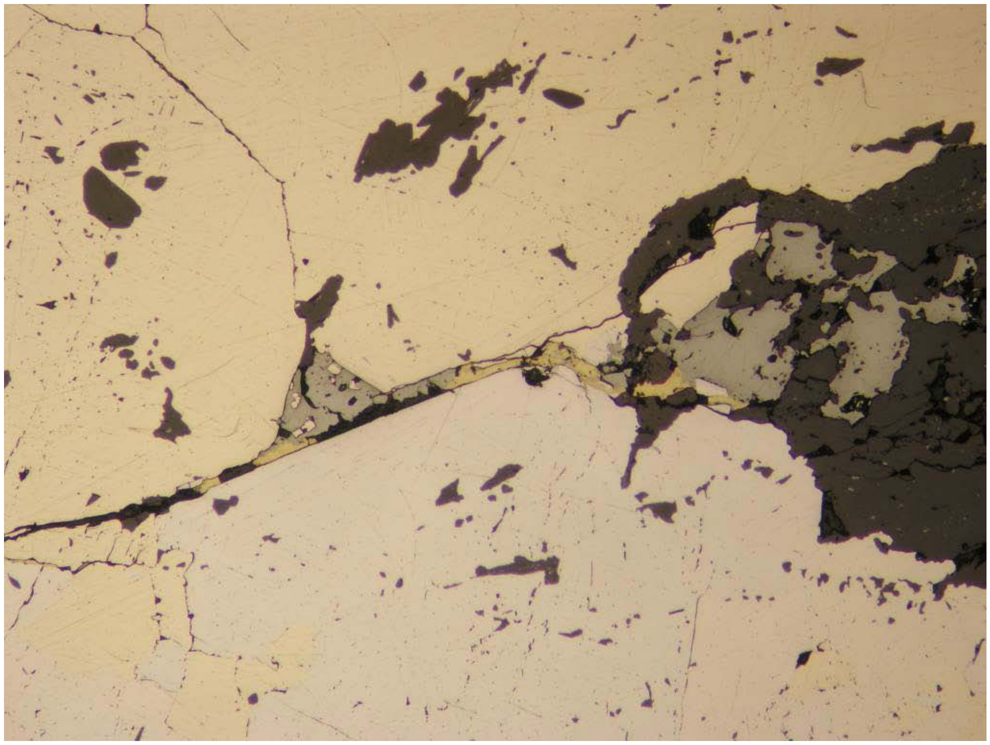

Figure 21: *Photomicrograph of sample 12 showing chalcopyrite (yellow) and tetrahedrite (olive grey) interstitial to pyrite (pale yellow) and arsenopyrite (off-white). RL, FOV = ~ 0.7 mm.*