

PETROGRAPHIC REPORT

CLIENT: Trevor Burr, AngloGoldAshanti
PROJECT/PROPERTY: CR STUDY
SAMPLE NUMBER: CR-0016

BY: James R. Shannon, Ph.D.
SAMPLE TYPE: Polished Thin Section
DATE: 26-June 2017

HAND SAMPLE DESCRIPTION: Core from 71.0 m. Medium-dark greenish gray, very fine to fine grained mylonitic schist. The sample is nonmagnetic with a pencil magnet. There is very weak effervescence in spots with dilute HCl.

POLISHED-SECTION DESCRIPTION:

MINERAL	EST %	COMMENTS
METAMORPHIC	[99]	Very fine to fine grained intergrowth with moderate alignment of elongated actinolitic amphibole; Local irregular mineralogical variations in distribution of amphibole, plagioclase, epidote, and ilmenite
Quartz	25	Anhedral grains and mosaic patches
Amphibole	20	Subhedral, elongated grains up to 1 mm; mottled yellow-green-bluegreen pleochroism; Irregularly distributed
Epidote	20	Subhedral to euhedral disseminated grains and patches to 0.1 mm; Appears to locally replace plagioclase
Plagioclase	10	Anhedral grains intergrown with quartz; Local larger twinned grains may be remnants from protolith
Chlorite	15	Anhedral patches irregularly distributed; Not clear if chlorite replaces amphibole
Carbonate	5	Anhedral grains and patches up to 1.0 mm; Weak effervescence suggests dolomite; patches are stretched parallel to amphibole lineation
Ilmenite?	3	Abundant, anhedral, sieve textures grains; Not magnetite; Local elongated grain shapes suggest ilmenite, but isotropic
Rutile-Leucoxene	0.3	Very fine disseminated patches associated with ilmenite
SULFIDES	[0.23]	
Pyrite	0.1	Minor disseminated subhedral pyrite up to 1 mm
Chalcopyrite	0.05	Subhedral-anhedral disseminated grains up to 0.3; Locally replaces bornite-digenite
Bornite	0.05	Brownish; Anhedral grains up to 0.2 mm
Digenite	0.03	Blue, Isotropic; Anhedral grains intergrown with bornite
VEINLETS	[Tr]	
Quartz	Tr	Trace, quartz microveinlets cut across mylonitic fabric

TEXTURES

The sample displays a well-developed mylonitic schist texture with moderately lineated actinolitic amphibole intergrown with recrystallized plagioclase and quartz. Some larger, twinned plagioclase grains may be remnants (probably recrystallized) of original plagioclase. Actinolitic amphibole has light green-bluegreen pleochroism. There is relatively abundant

disseminated epidote that appears to replace plagioclase. Abundant chlorite occurs in irregular grains and patches. It is not clear if chlorite replaces amphibole. The metamorphic assemblage consists of actinolite-epidote-albite(?) - quartz.

There are definite mineralogical variations that occur along irregular bands. Minerals with variable abundance include amphibole, plagioclase, quartz, ilmenite, and chlorite. The mineralogical banding may be related to metamorphic differentiation or heterogeneities in the protolith. An earlier metamorphic event may have produced incipient gneissic layering which has been disrupted and overprinted by a second metamorphic event associated with mylonitic deformation.

The sample has relatively abundant chlorite and carbonate (dolomitic). They occur in elongated patches that parallel amphibole lineations suggesting they are pre- or syn-metamorphism. Minor mineralization includes disseminated pyrite and chalcopyrite-bornite-digenite associated with disseminated epidote and quartz.

COMMENTS

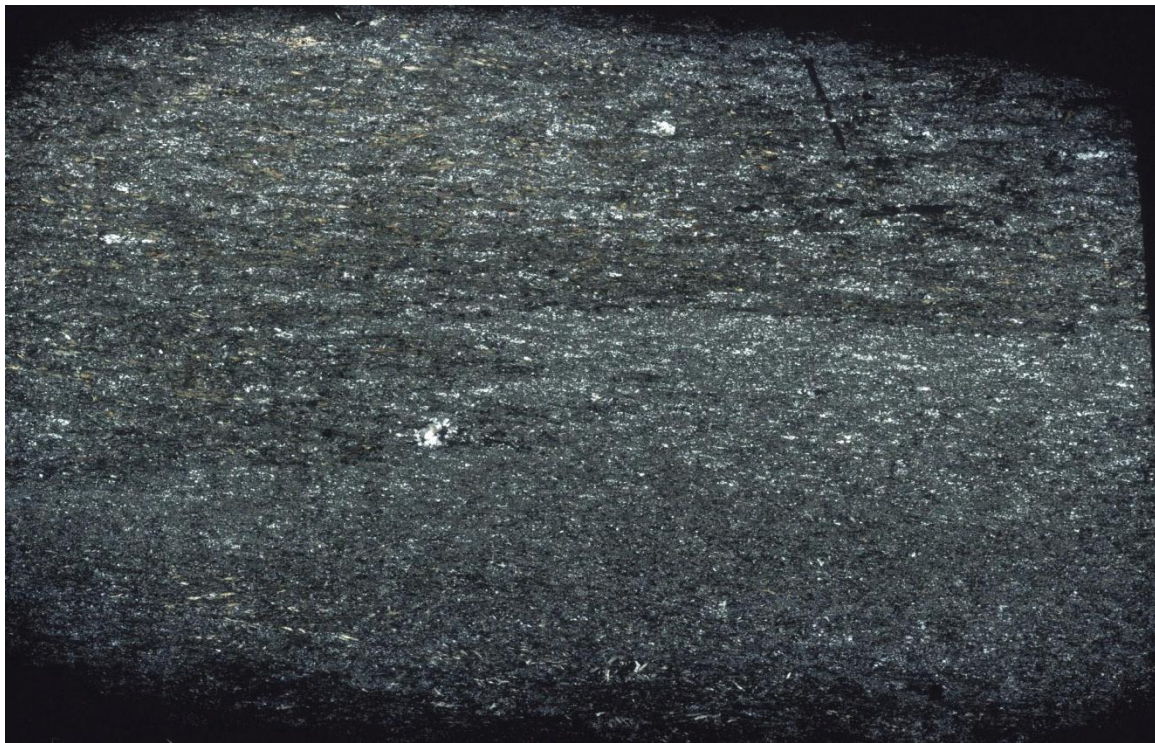
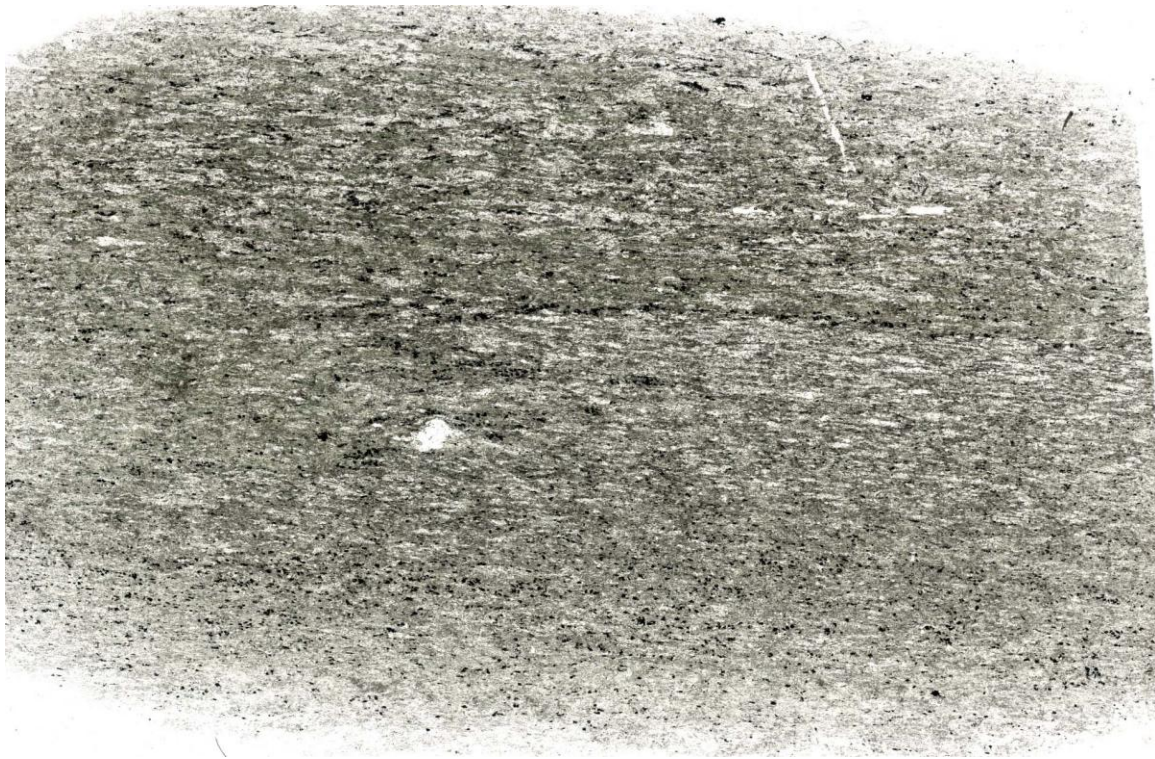
The sample does not have evidence of biotite. It is not clear what chlorite has replaced?

METAMORPHISM

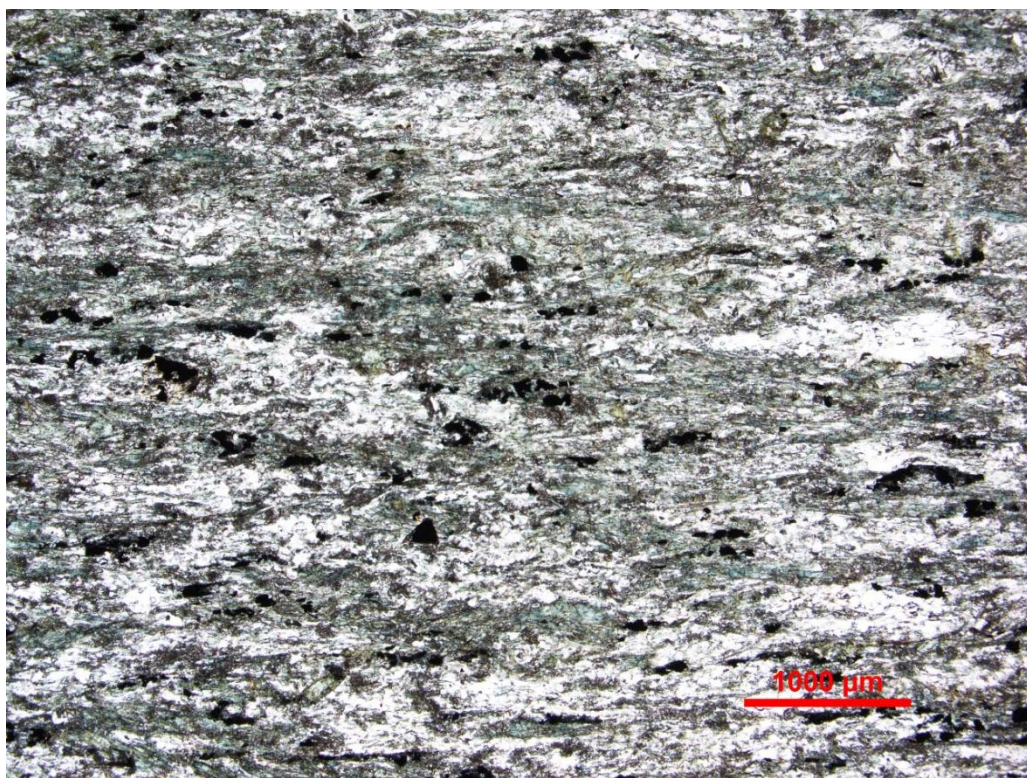
The sample has a well-developed actinolite-epidote-chlorite metamorphic mineral assemblage indicating medium grade metamorphism equivalent to amphibolite facies. Mineralogical banding does not parallel amphibole lineations suggesting possible metamorphic differentiation may have occurred during an earlier metamorphic event. This interpretation is similar to sample CR-0001 that suggests two or three metamorphic event/overprints.

ROCK NAME: Actinolite-Epidote Mylonitic Schist

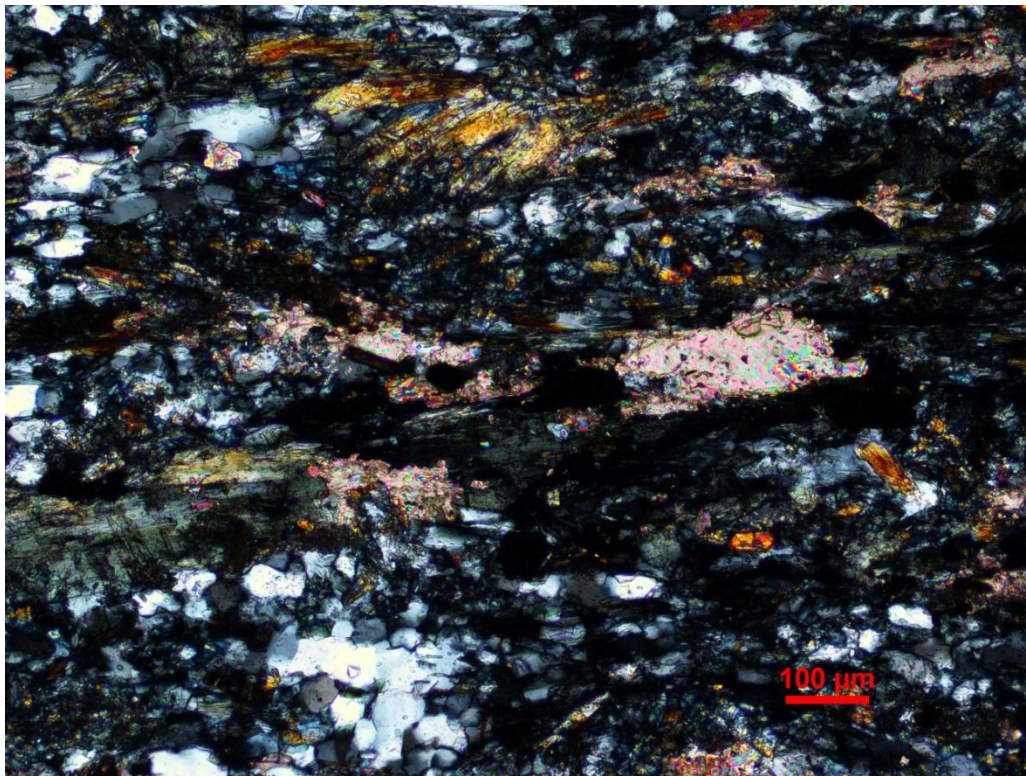
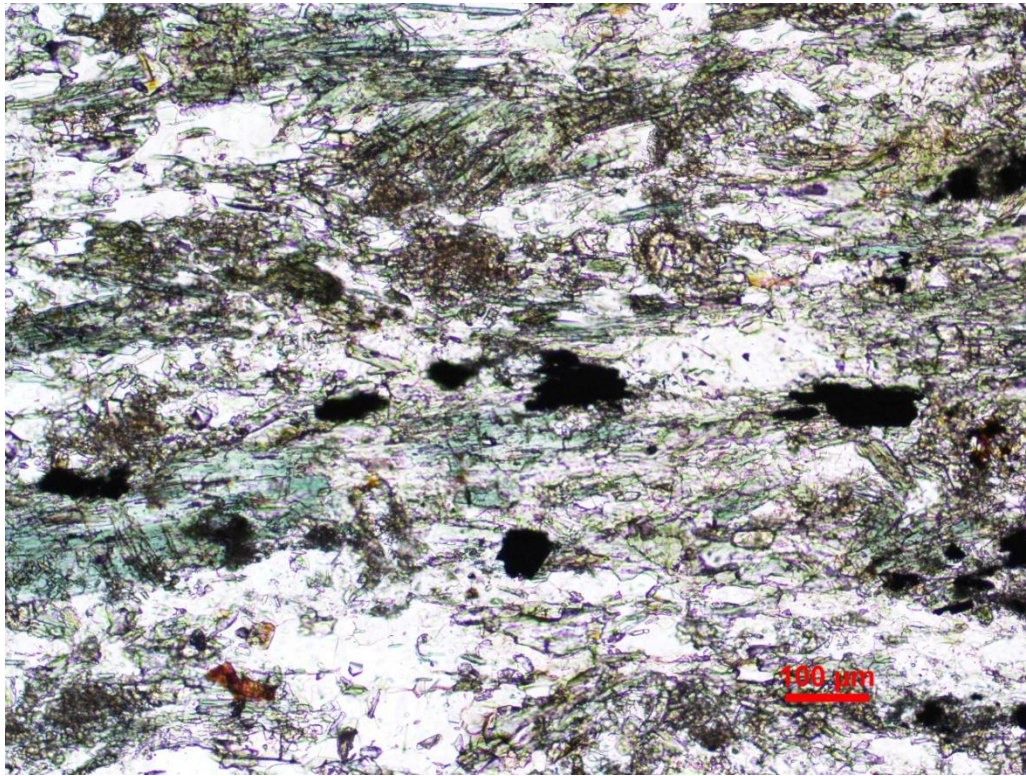
PROTOLITH: Uncertain protolith; The mineralogy suggests a felsic protolith

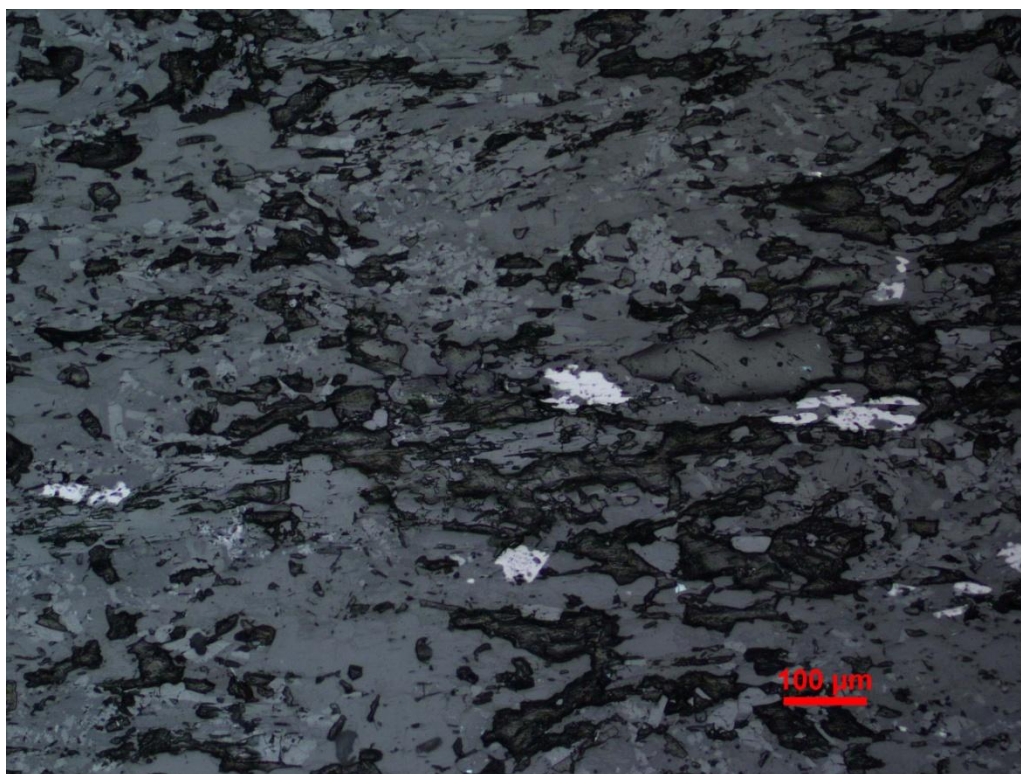


Sample CR-0016. Wide-field, full-thinsection view showing very fine to fine grained, mylonitic schist. Top- plane light; Bottom- crossed polarizers.

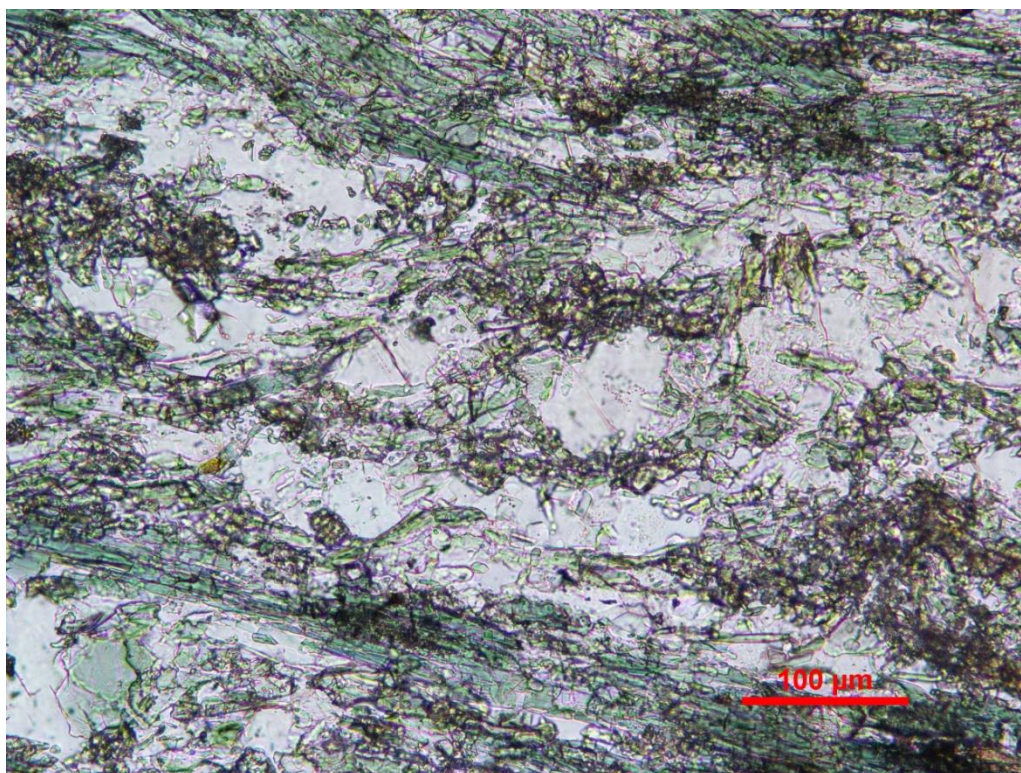


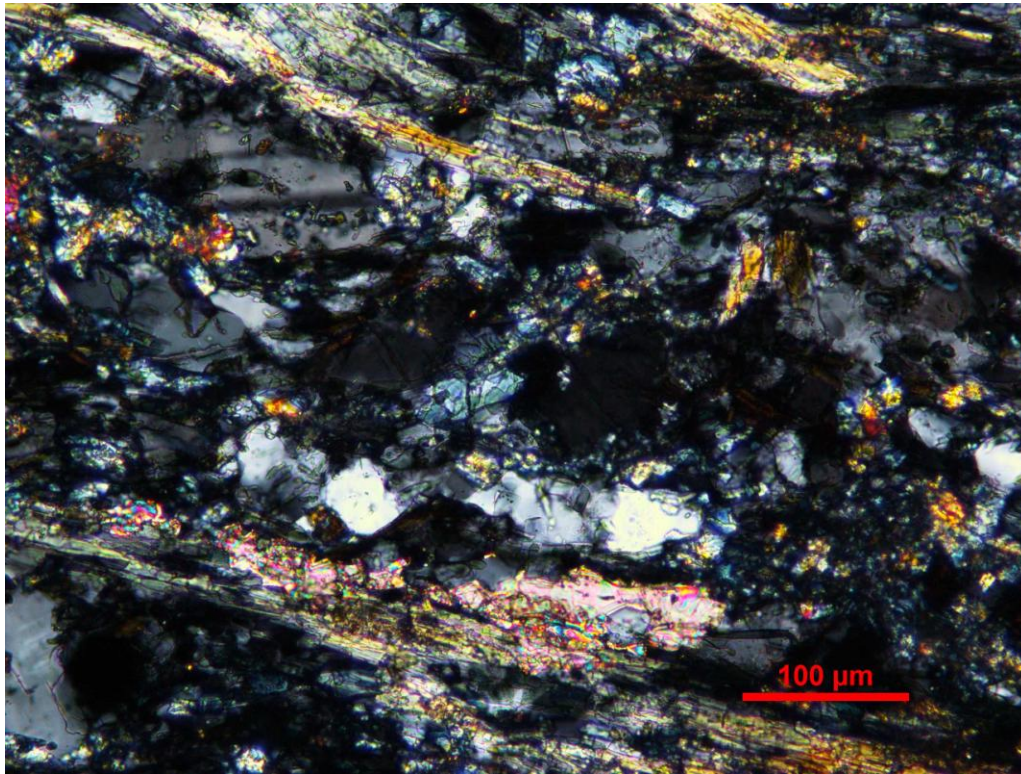
Sample CR-0016. Mylonitic schist with strong recrystallization and moderate lineation. Top- plane light; Bottom- crossed polarizers.



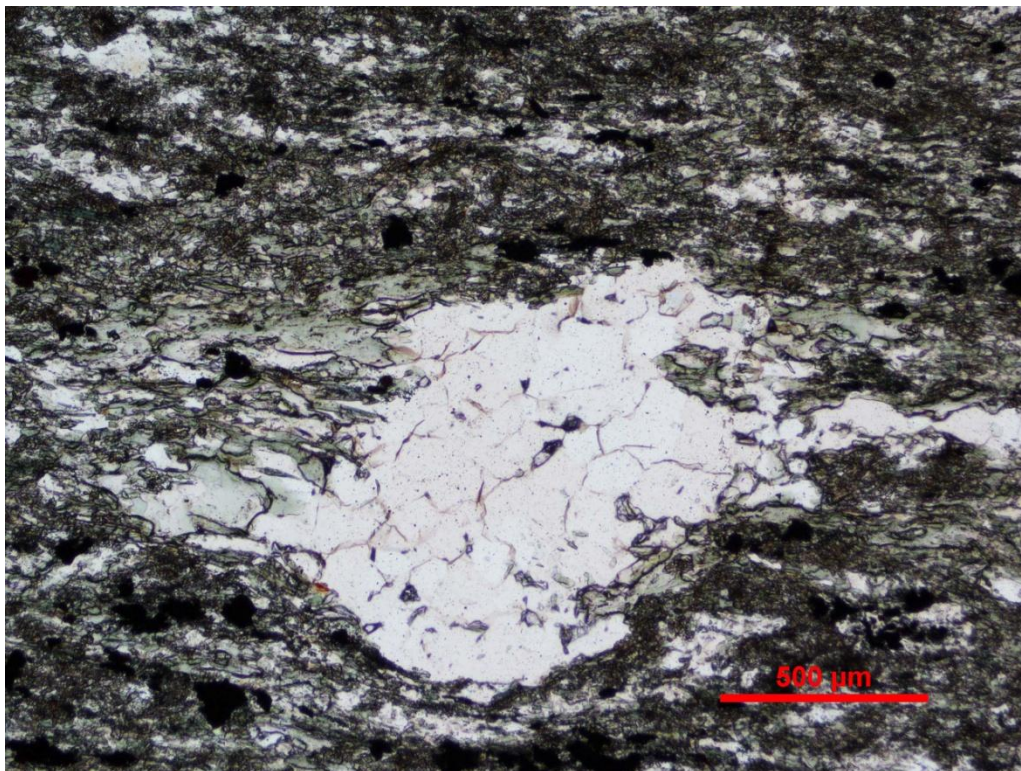


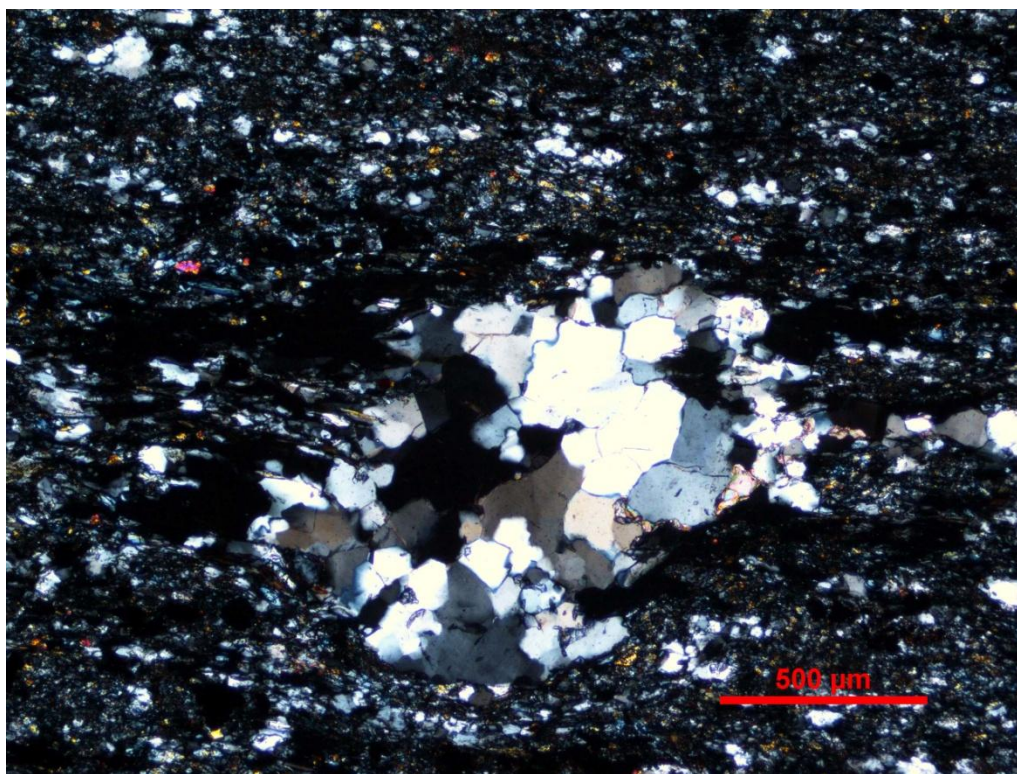
Sample CR-0016. Lineated bluegreen actinolitic amphibole with disseminated epidote, ilmenite, and carbonate patches. Top- plane light; Middle- crossed polarizers; Bottom- reflected light.



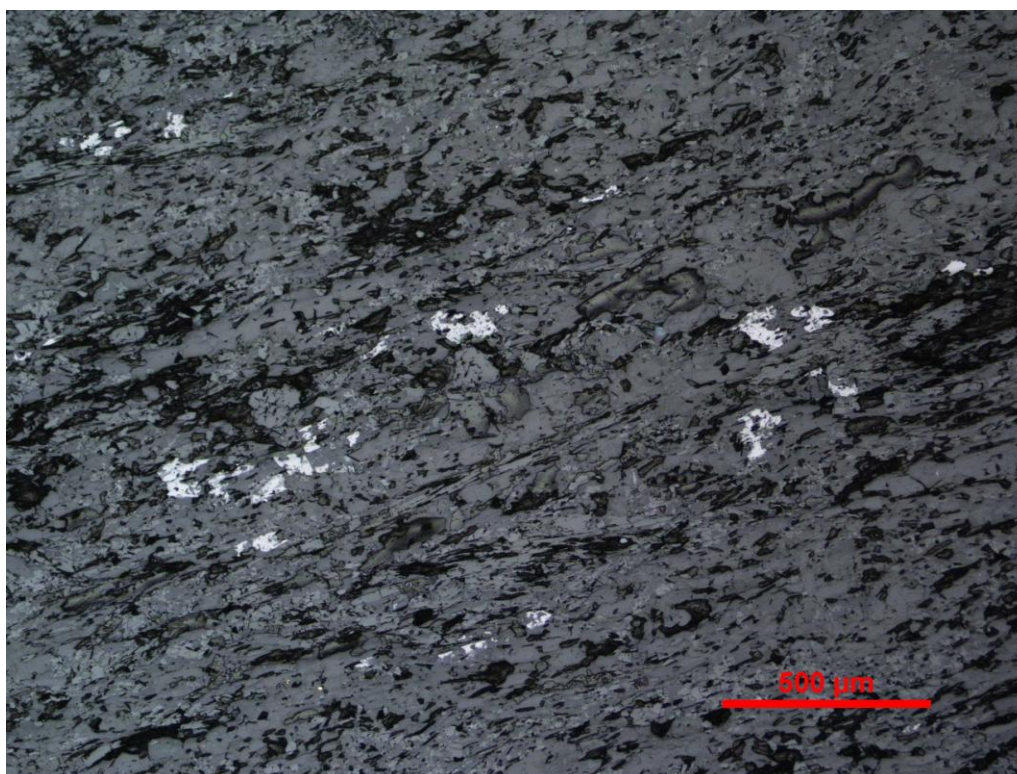


Sample CR-0016. Remnant of plagioclase grain with twinning (upper left). Note disseminated granular epidote (birefringent) and carbonate patch (bottom). Top- plane light; Bottom- crossed polarizers.

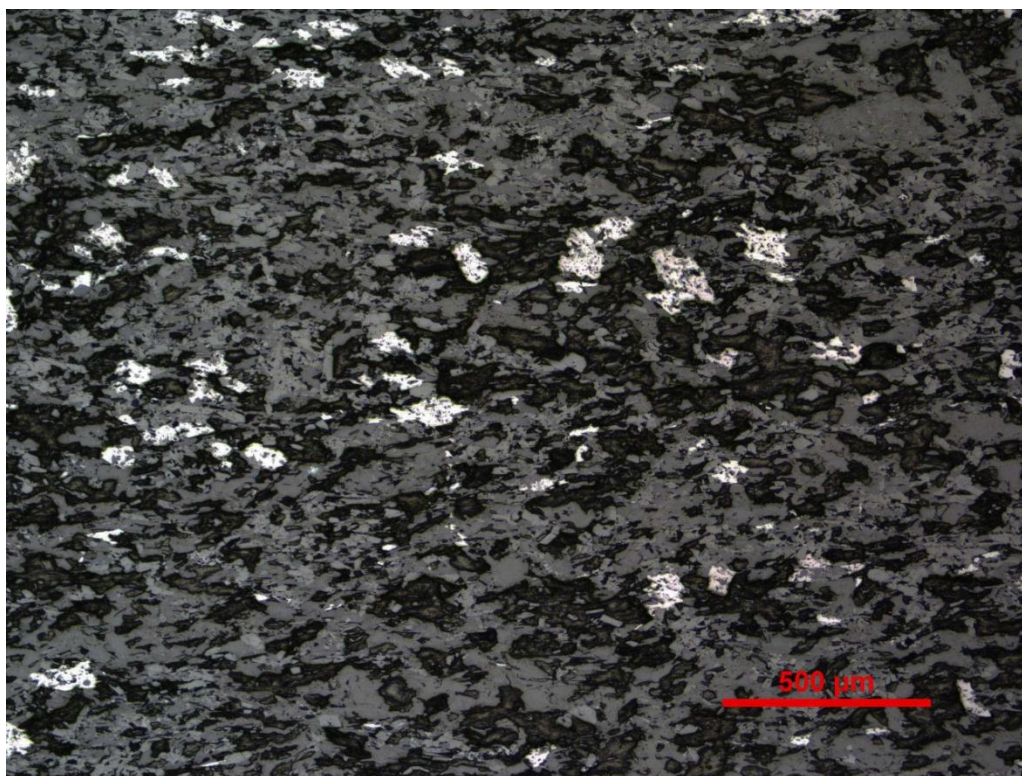




Sample CR-0016. Recrystallized quartz clot with chlorite-quartz pressure shadows. Top- plane light; Bottom- crossed polarizers.

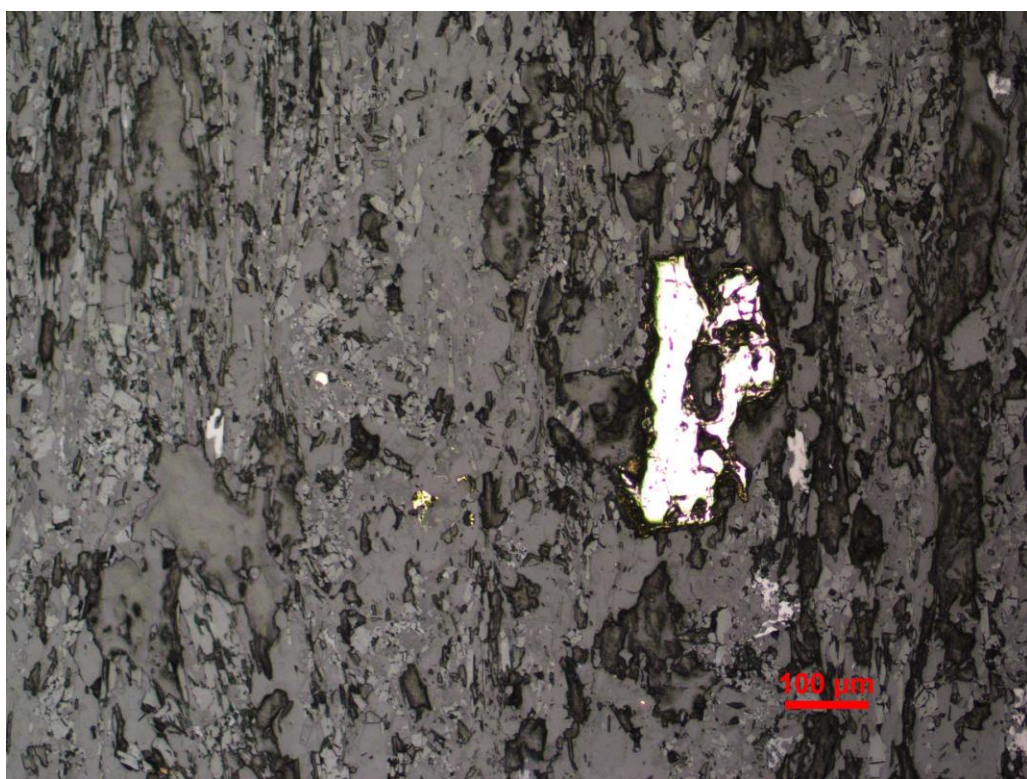
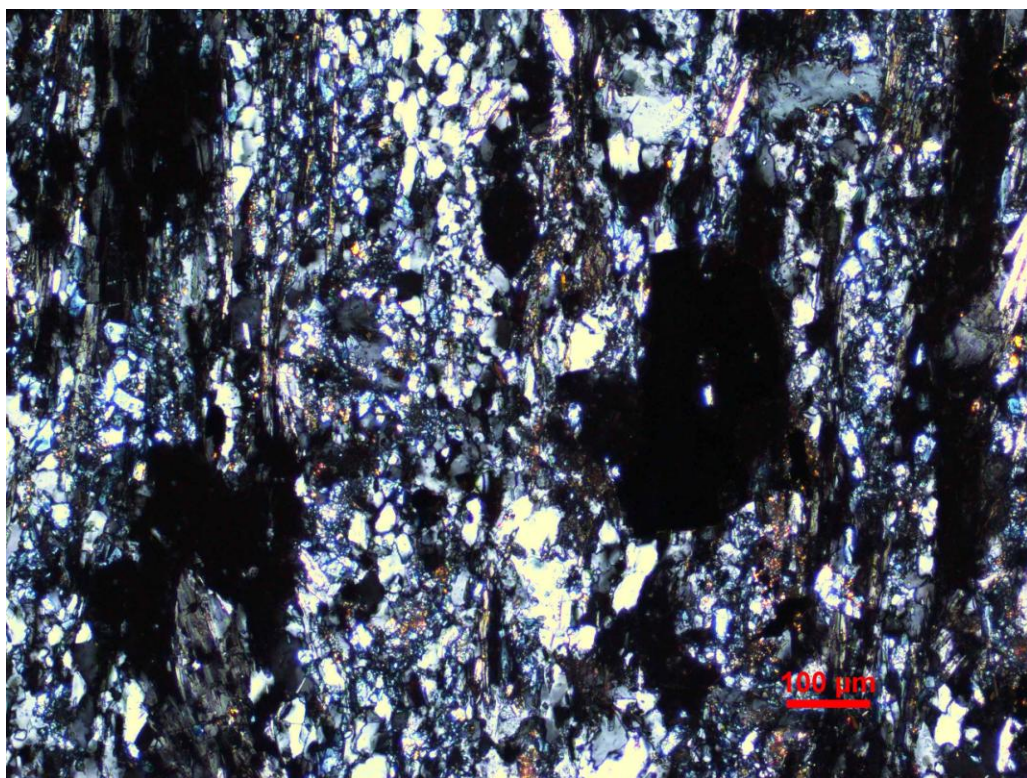


Sample CR-0016. Low chlorite (very low reflectivity) area with less disseminated ilmenite. Reflected light.

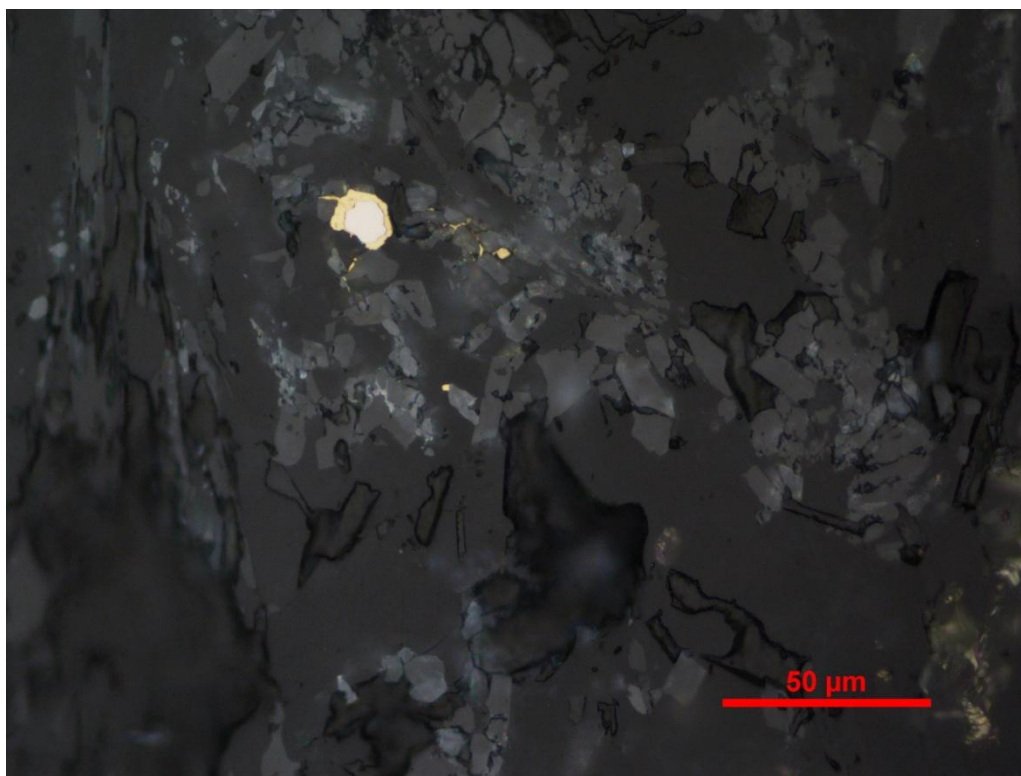


Sample CR-0016. High chlorite (very low reflectivity) area with abundant ilmenite. Reflected light.

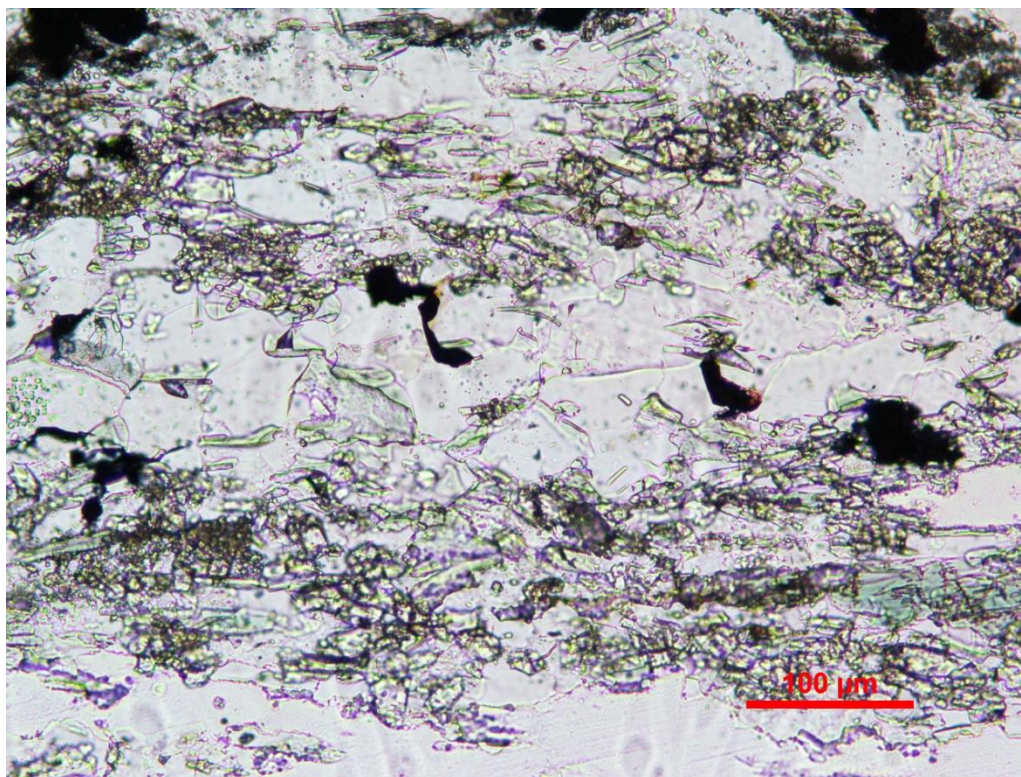


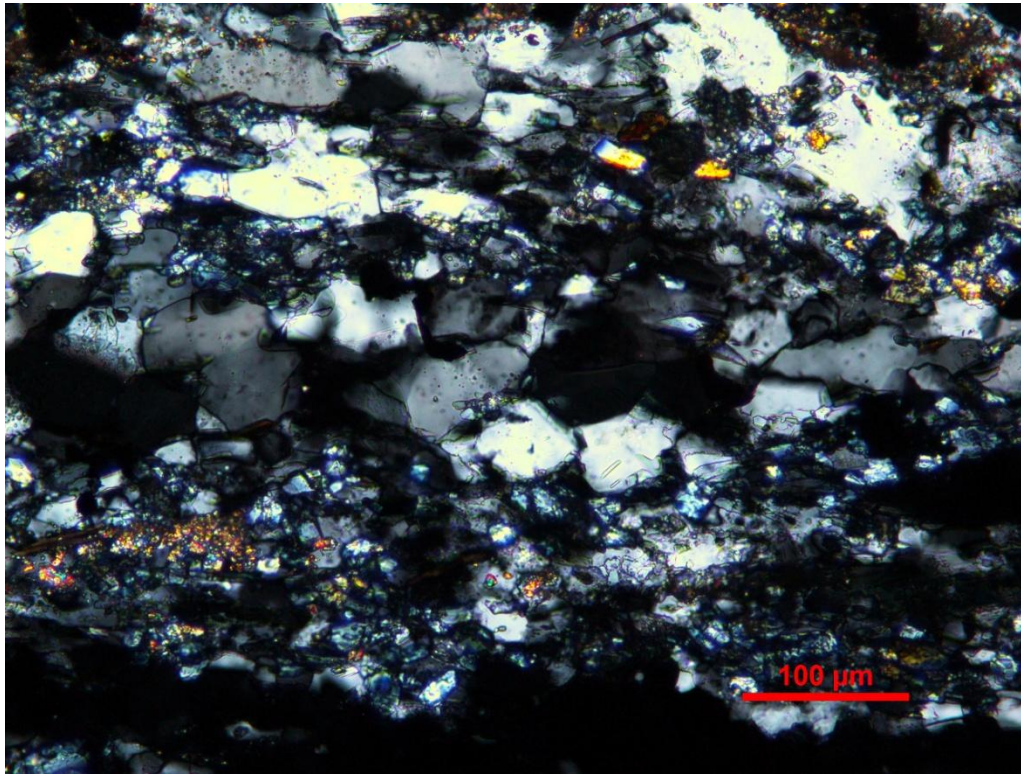


Sample CR-0016. Mylonitic schist with disseminated ilmenite (lt gray), pyrite (right) and chalcopyrite (left). Top- plane light; Middle- crossed polarizers; Bottom- reflected light.

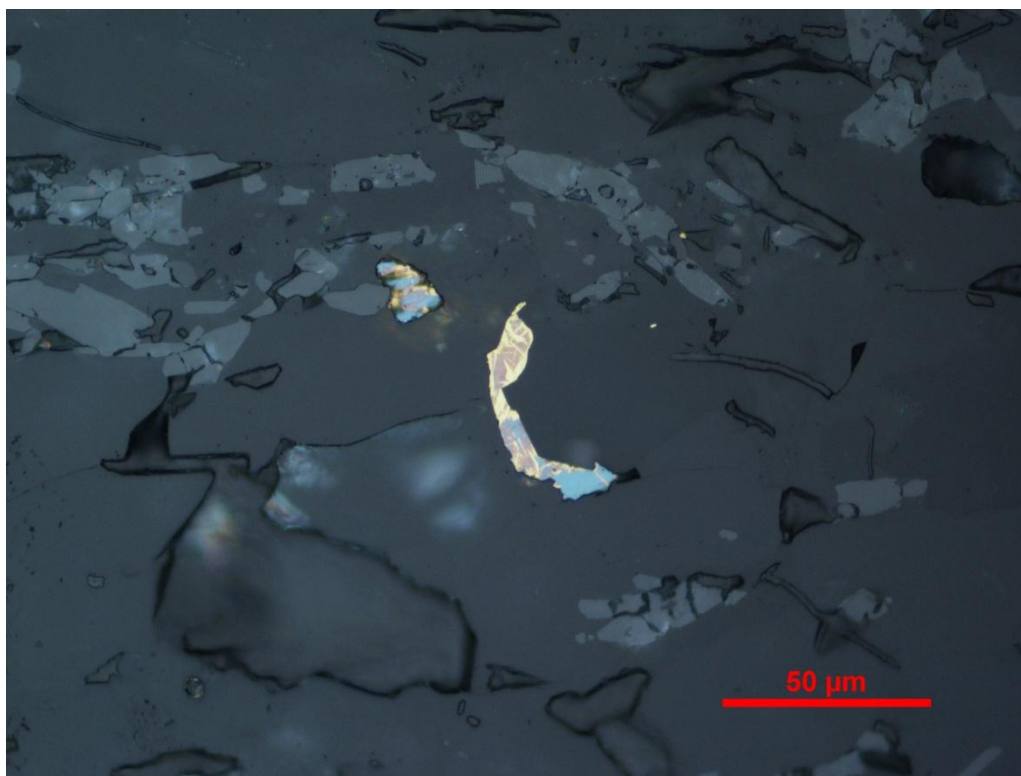


Sample CR-0016. Fine disseminated chalcopyrite locally rimming pyrite(?) and associated with subhedral disseminated epidote. Reflected light.

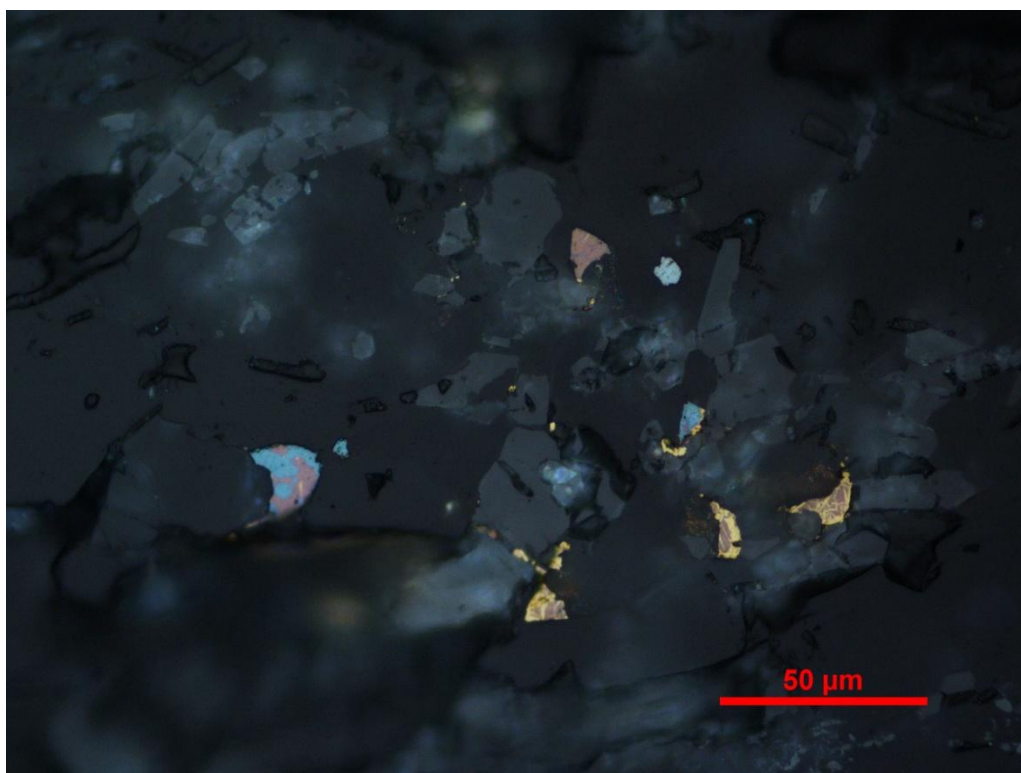




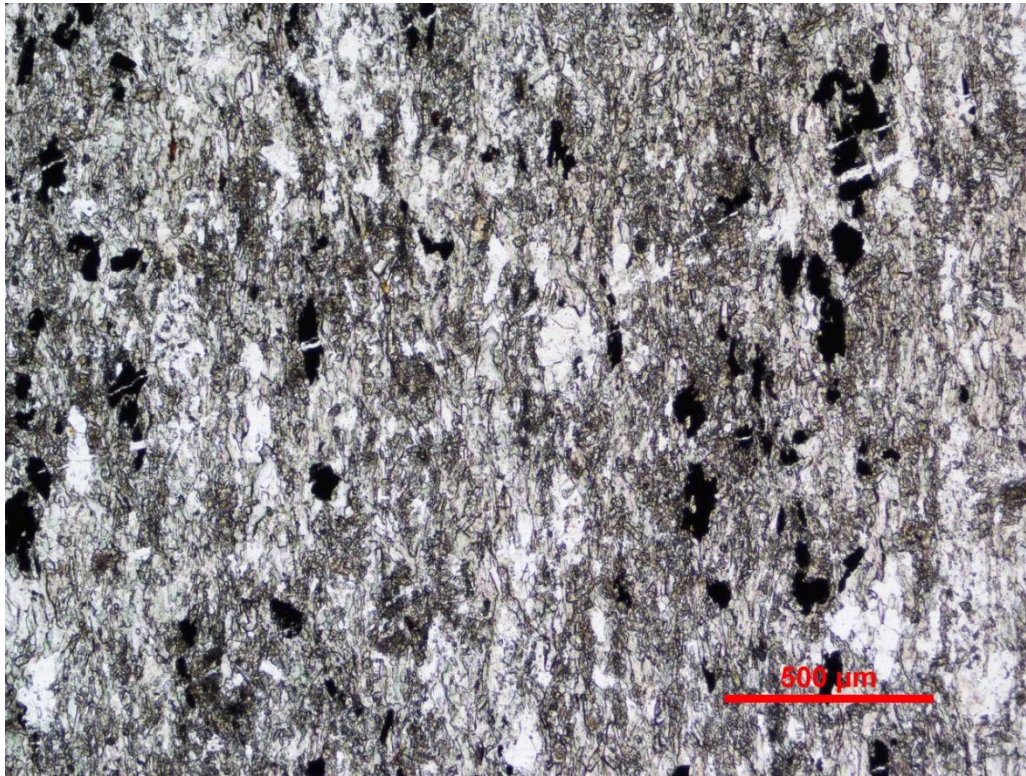
Sample CR-0016. Fine disseminated sulfides (chalcopyrite-bornite-digenite) in quartz band. Top-plane light; Middle- crossed polarizers; Bottom- reflected light.



Sample CR-0016. Close up from above showing bornite(brownish)-digenite(blue) partly replaced by chalcopyrite(yellow). Reflected light.



Sample CR-0016. Fine disseminated bornite(brownish)-digenite(blue) and bornite grains partly replaced by chalcopyrite (yellow). Reflected light.



Sample CR-0016. Irregular, discontinuous, quartz microveinlets cutting across mylonitic fabric. Plane light.