

## PETROGRAPHIC REPORT

**CLIENT:** Trevor Burr, AngloGoldAshanti  
**PROJECT/PROPERTY:** CR STUDY  
**SAMPLE NUMBER:** CR-0002

**BY:** James R. Shannon, Ph.D.  
**SAMPLE TYPE:** Polished Thin Section  
**DATE:** 28-June 2017

**HAND SAMPLE DESCRIPTION:** Core from 33.0 m showing light to dark gray, very fine to medium grained, gneissic, biotite phyllitic schist. Only a small piece of core was provided and a 1 to 2 cm thick quartz-feldspar segregation band dominates the sample and polished thinsection (about 65 percent of the thinsection). Small 1 mm staurolite microporphyroblasts are not conspicuous in hand sample. The sample is nonmagnetic with a pencil magnet and does not react to dilute HCl.

### POLISHED-SECTION DESCRIPTION:

MINERAL	EST %	COMMENTS
<b>METAMOPHIC</b>		
<b>PORPHYROBLAST</b>	<b>[5]</b>	
Staurolite	5	Subhedral-anhedral, sieve-textured microporphyroblasts up to 1 mm; Yellow pleochroism, Biaxial (-) 2V ~80; sector twinning; Locally replaced by chlorite
<b>MATRIX</b>	<b>[30]</b>	Moderately foliated plagioclase-biotite-quartz intergrowth with minor suggestions of S-C mylonitic shear fabrics
Plagioclase	15	Anhedral grains up to 0.3 mm; Flattened parallel to biotite foliation
Biotite	10	Subhedral, elongated grains intergrown with plagioclase and quartz
Quartz	5	Anhedral grains up to 0.1 mm; Flattened parallel to biotite foliation
<b>ACCESSORY</b>	<b>[2]</b>	
Ilmenite	2	Subhedral-anhedral grains up to 0.2 mm
Sphene	Tr	Minor anhedral-subhedral grains up to 0.1 mm
<b>SEGREGATIONS</b>	<b>[65]</b>	Irregular metamorphic quartz-plagioclase-biotite segregations up to 1.5 cm thick; Minor suggestions of S-C mylonitic shear textures
Quartz	13	Anhedral grains up to 1.5 mm
Plagioclase	43	Anhedral grains up to 2 mm; remnant albite twinning
Biotite	10	Anhedral-subhedral grains up to 1.5 mm
<b>ALTERATION</b>	<b>[12]</b>	
Chlorite	10	Pale light greenish chlorite locally replace biotite in segregation bands and schist
Sericite	2	Very fine grained white mica (birefringent) locally replaces plagioclase
Carbonate	0.3	Anhedral grains up to 0.2 mm intergrown with quartz in segregation bands; Possible dolomitic composition
<b>SULFIDES</b>	<b>[1.1]</b>	
Pyrite	1	Anhedral grains up to 0.6 mm; Associated with chlorite, sericite

		and carbonate
Chalcopyrite	0.1	Anhedral-subhedral grains up to 0.2 mm; Associated with sericite and chlorite

## TEXTURES

The sample displays a very fine to medium grained, phyllitic schist texture. There are staurolite microporphyroblasts (5 percent, up to 1 mm) conspicuous in thinsection, but not obvious in hand sample. The schist consists of a very fine to fine grained plagioclase-biotite-quartz intergrowth with accessory disseminated ilmenite. The plagioclase and quartz are completely recrystallized into anhedral mosaic intergrowths with flattened grains that parallel the moderate-strong biotite foliation.

The thinsection and billet are dominated by a 1.5 cm thick quartz-plagioclase-biotite segregation band that parallels biotite foliation. The segregation bands have similar mineralogy as the schist, but are much more quartz-rich. In addition, the segregation bands are characterized by a much coarser grain size than the schist. The quartz has moderate-strong undulatory extinction and is recrystallized. However, the degree of grain-size reduction is not as high as in the schist. There are some possible S-C mylonitic shear fabrics in the segregation bands/lenses.

There is weak hydrothermal alteration including chloritization of biotite and sericitization of plagioclase. Very weak mineralization includes disseminated pyrite and chalcopyrite. The disseminated sulfides are associated with chlorite and sericite. Disseminated pyrite is locally drawn out parallel to biotite foliation suggesting some pyrite is syn-metamorphism.

## COMMENTS

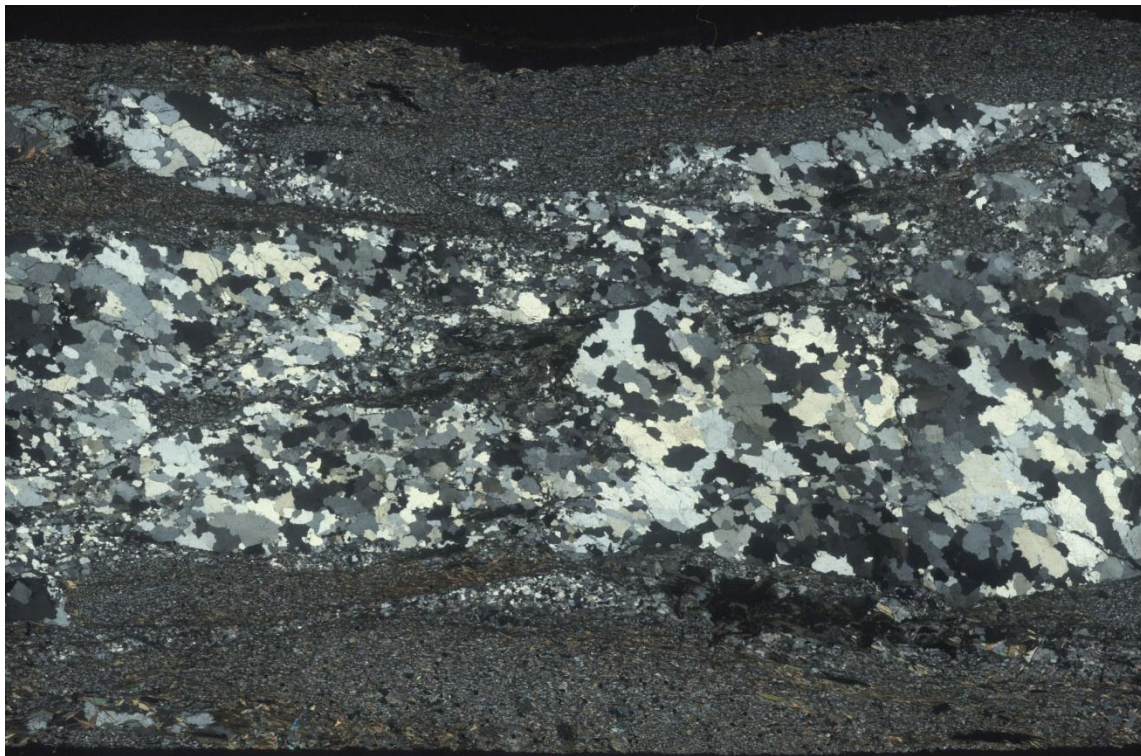
This sample lacks evidence of amphibole and epidote.

## METAMORPHISM

The biotite-plagioclase-quartz assemblage suggests a low-medium grade of metamorphism equivalent to lower amphibolite or upper greenschist facies. There does not appear to be evidence of a metamorphic or retrograde overprint, in contrast to other samples in the suite. The sample has evidence of a weak alteration overprint with a chlorite-sericite-sulfide assemblage.

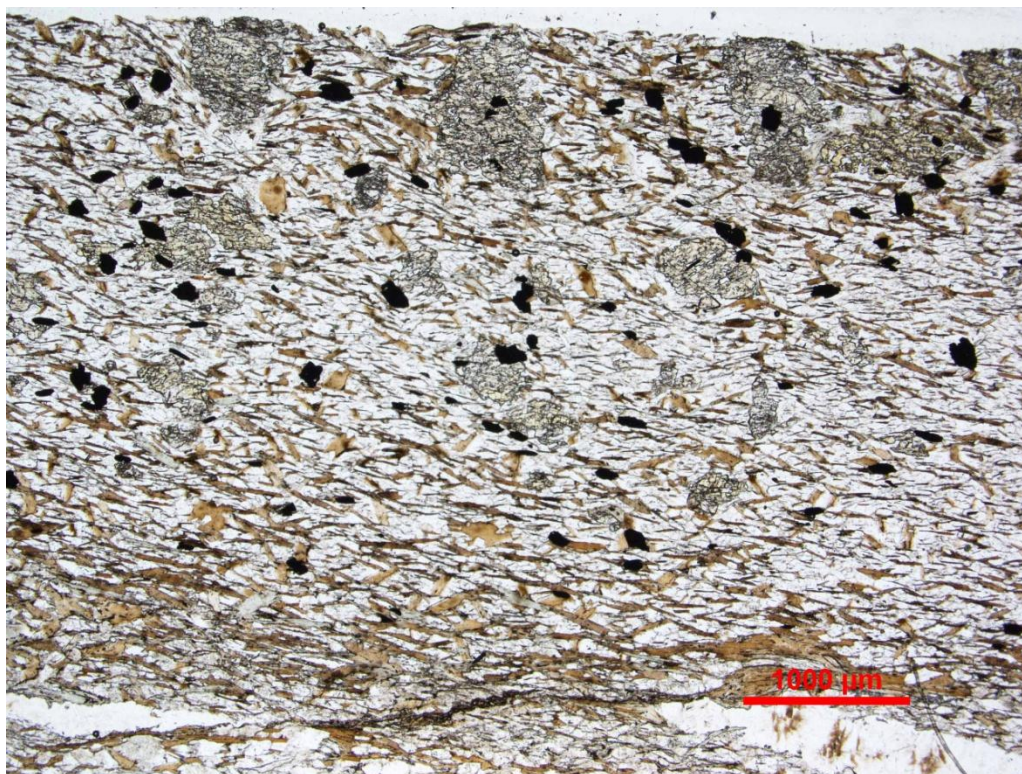
**ROCK NAME: Gneissic Biotite Phyllitic (Mylonitic?) Schist**

**PROTOLITH: Uncertain protolith; Intermediate composition**



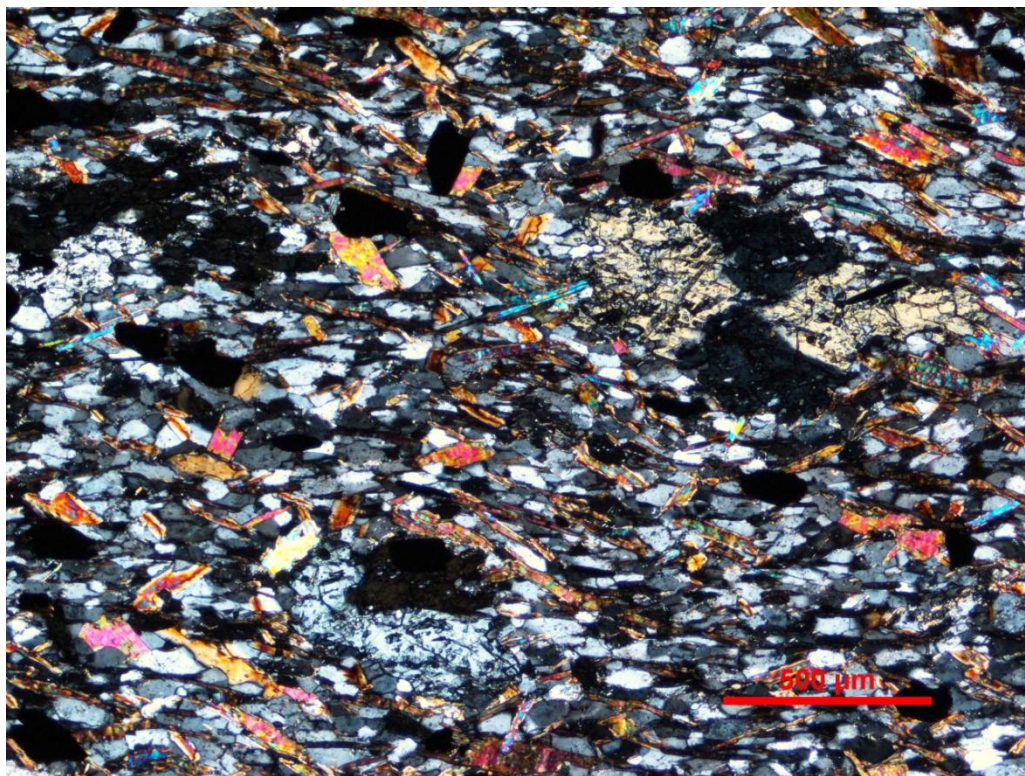
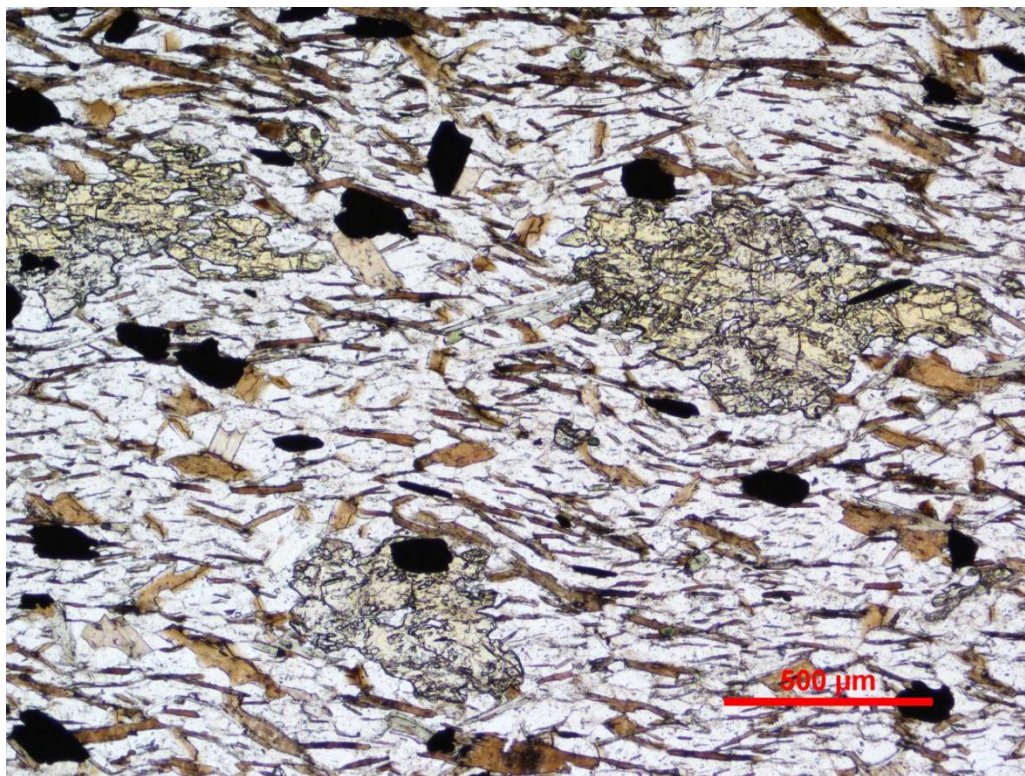
Sample CR-0002. Wide-field, full-thinsection view showing very fine grained, biotite phyllitic schist with irregular quartz-feldspar segregations. Top- plane light; Bottom- crossed polarizers.



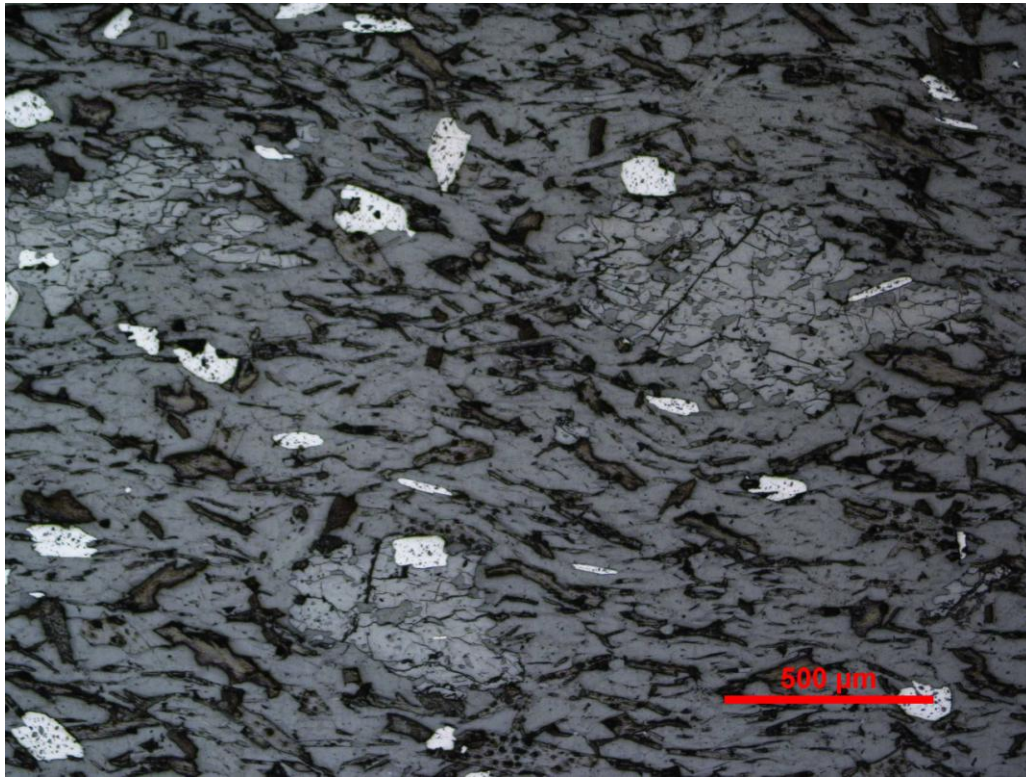


Sample CR-0002. Subhedral staurolite microporphyroblasts (across top) in gneissic, mylonitic schist. Top- plane light; Bottom- crossed polarizers.





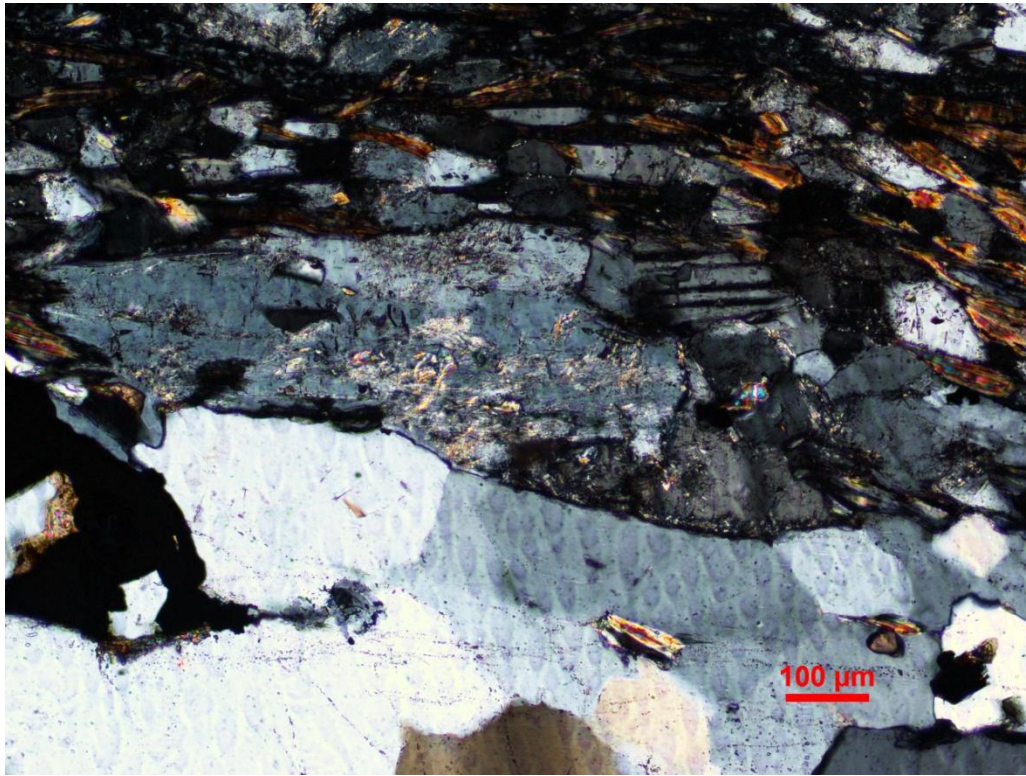




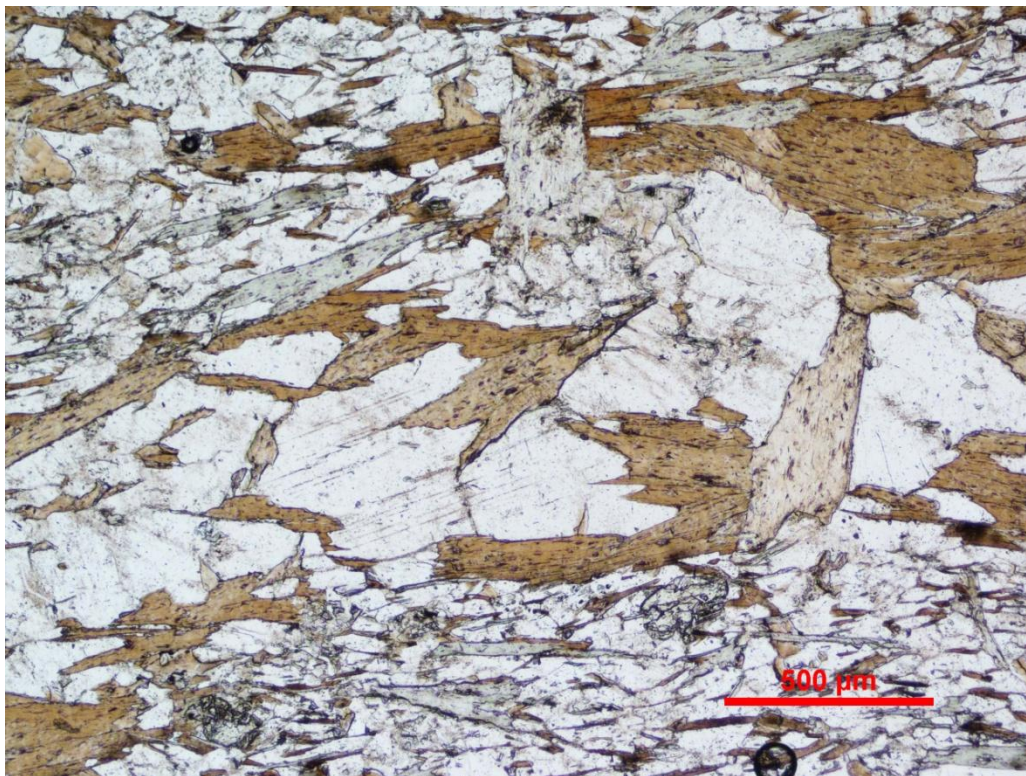
Sample CR-0002. Subhedral staurolite microporphyroblasts and disseminated ilmenite in foliated biotite schist. Top- plane light; Middle- crossed polarizers; Bottom- reflected light.



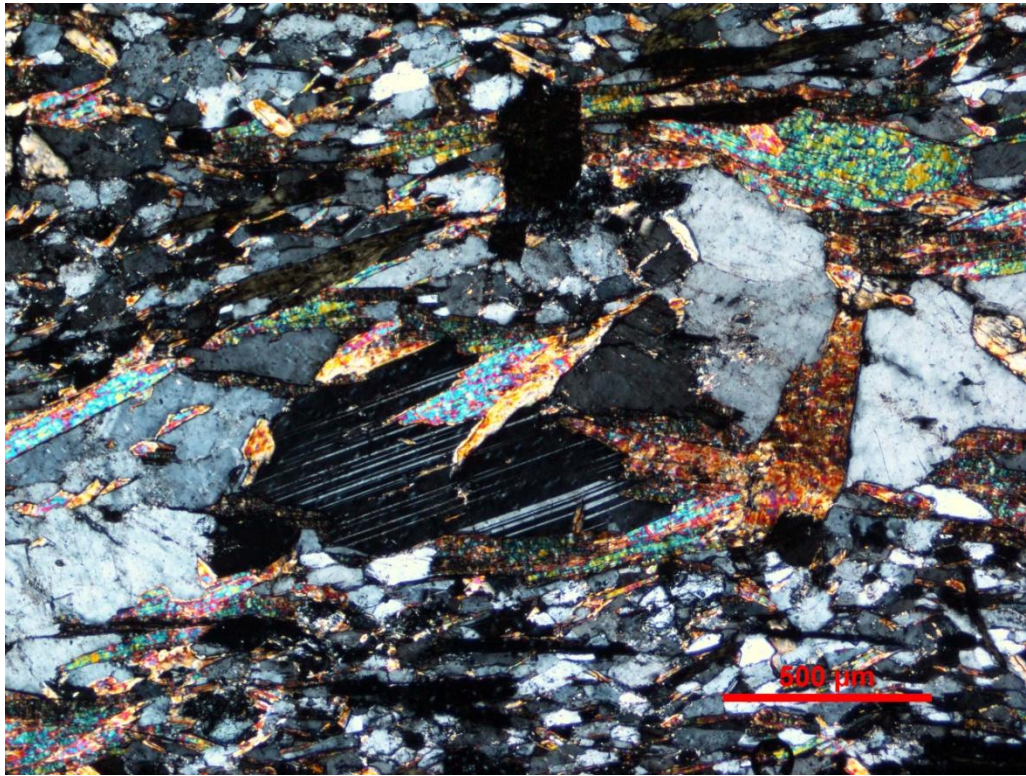




Sample CR-0002. Plagioclase with albite twinning and local weak sericite alteration. Top- plane light; Bottom- crossed polarizers.



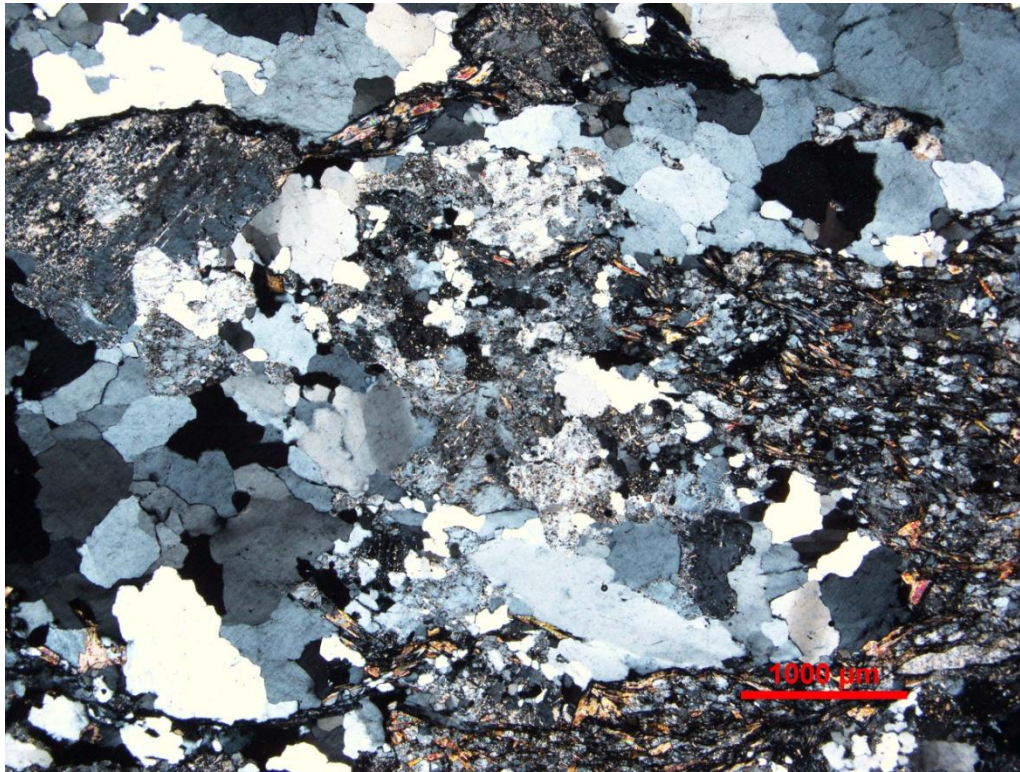




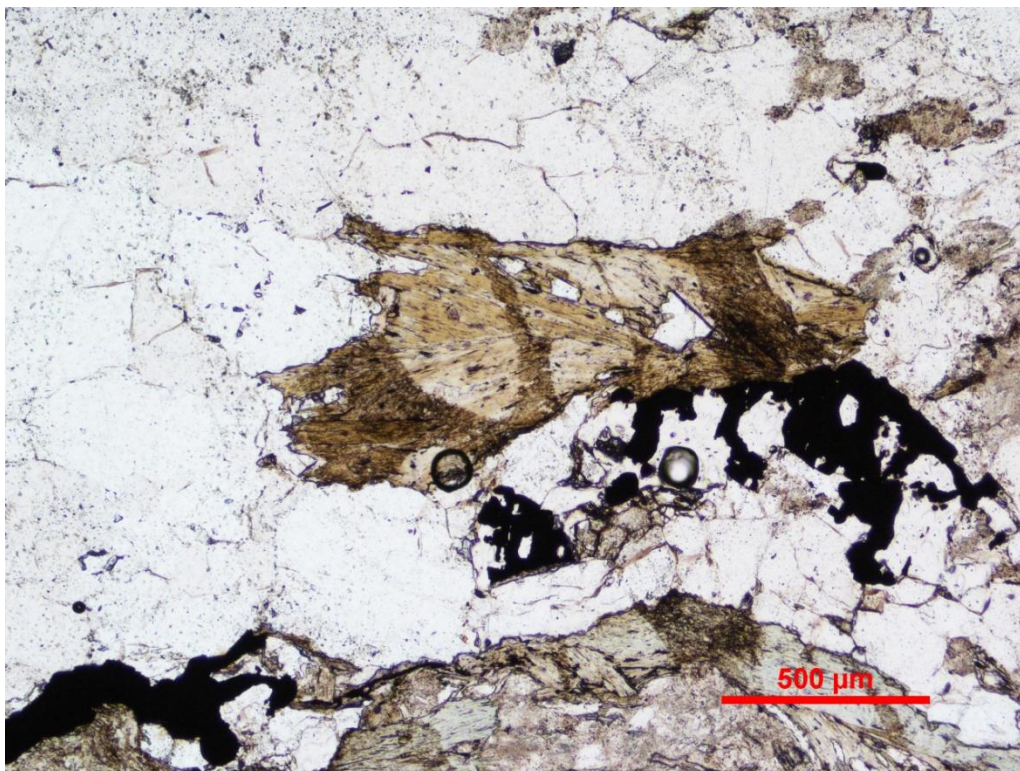
Sample CR-0002. Albitic twinning in anhedronal plagioclase in thin segregation band of coarser grained quartz-plagioclase-biotite. Note pale green chlorite locally replaces biotite. Top- plane light; Bottom- crossed polarizers.



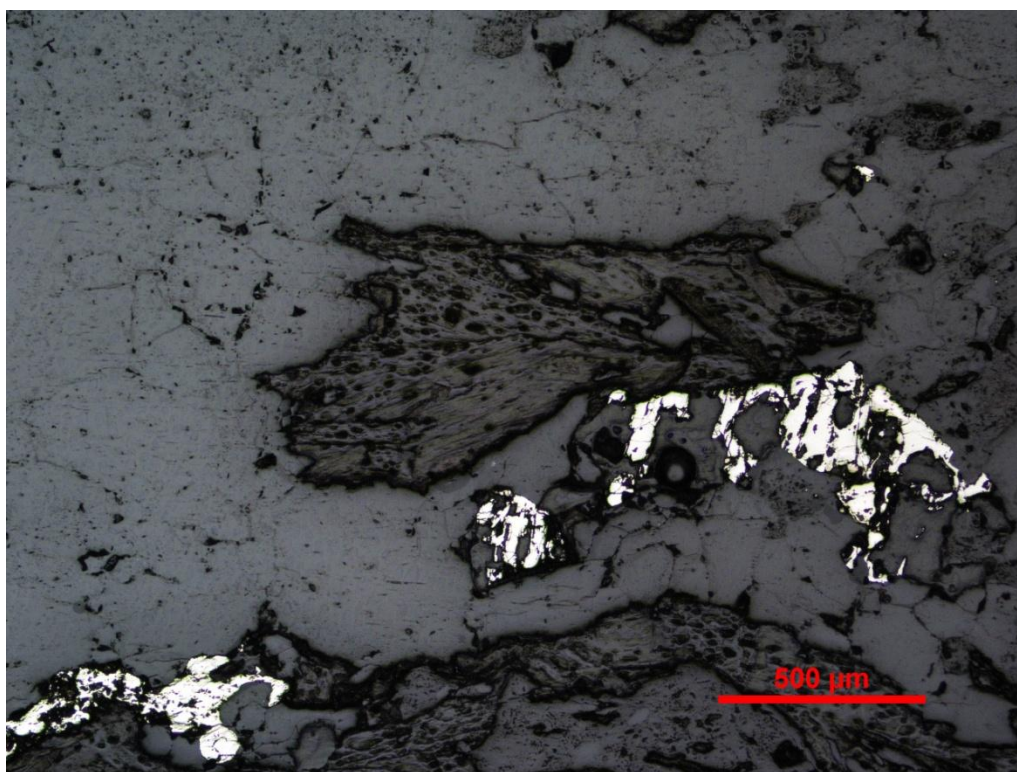
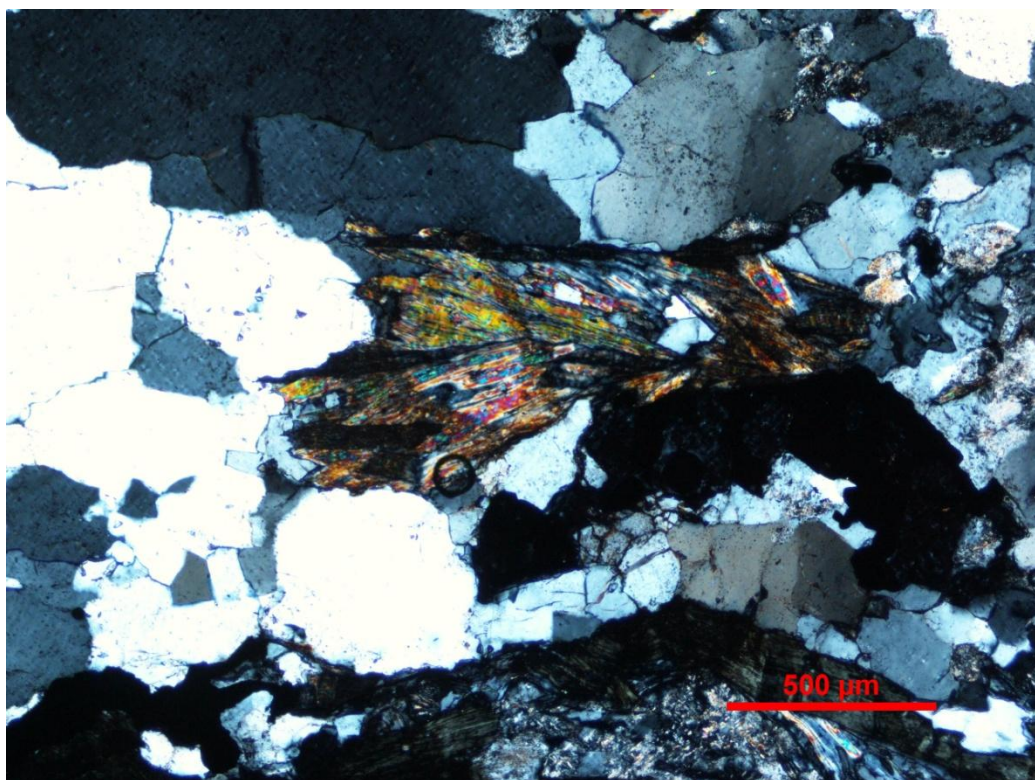




Sample CR-0002. Weak to moderate sericite alteration of plagioclase in quartz-plagioclase-biotite segregation band. Top- plane light; Bottom- crossed polarizers.

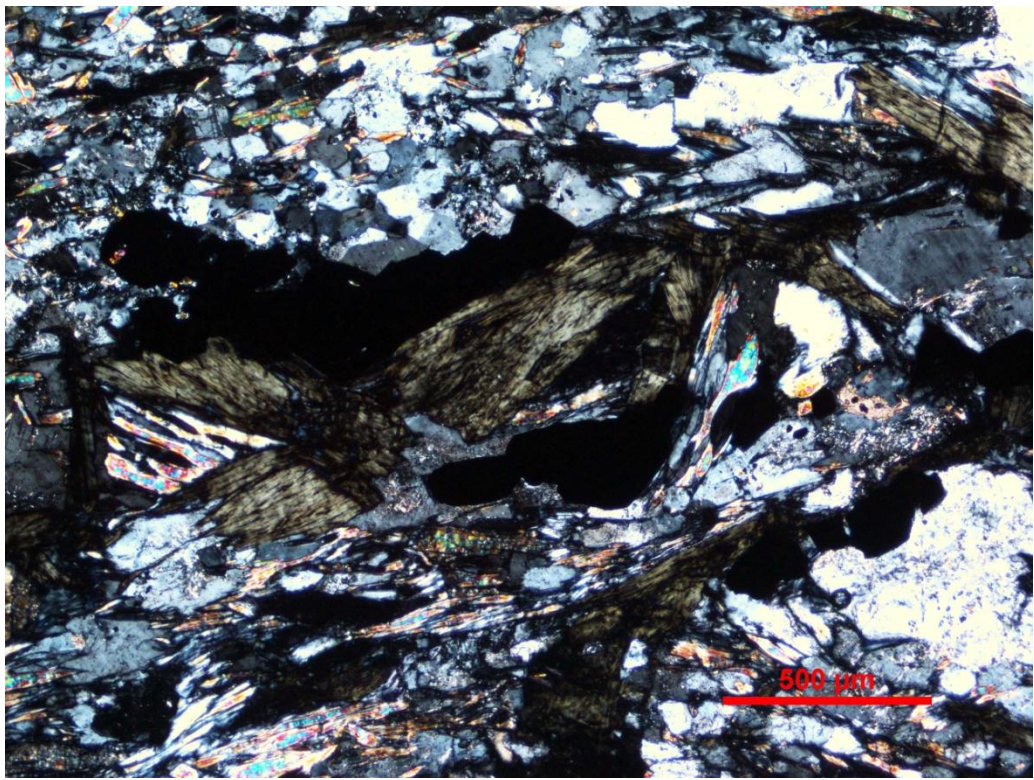
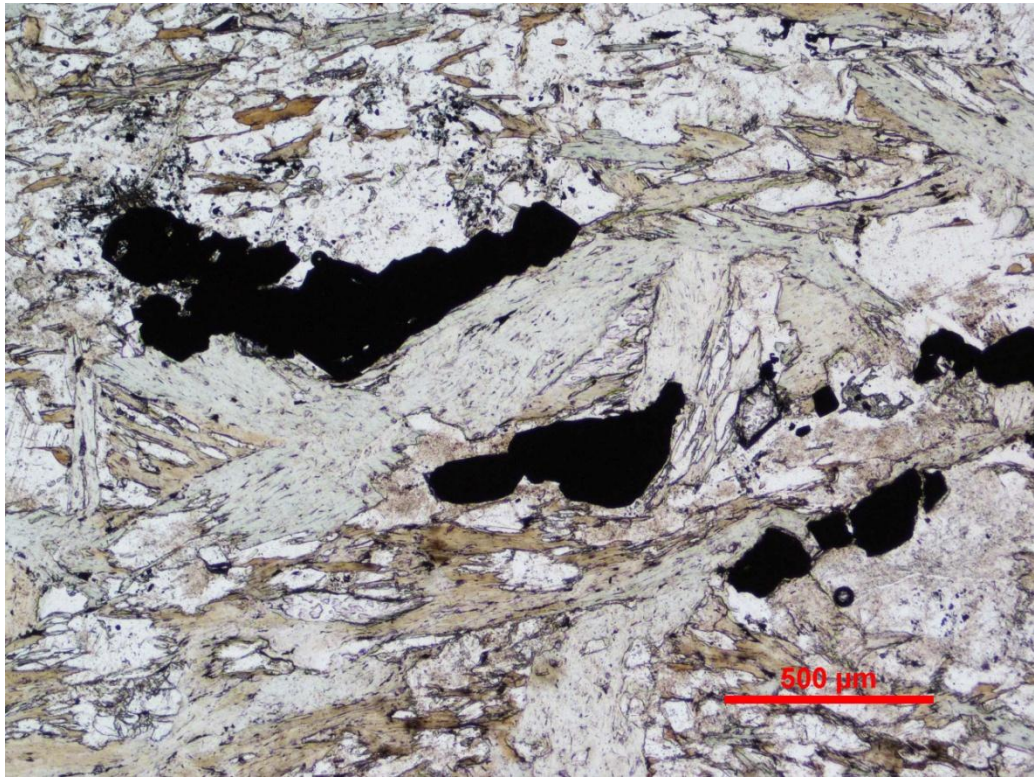




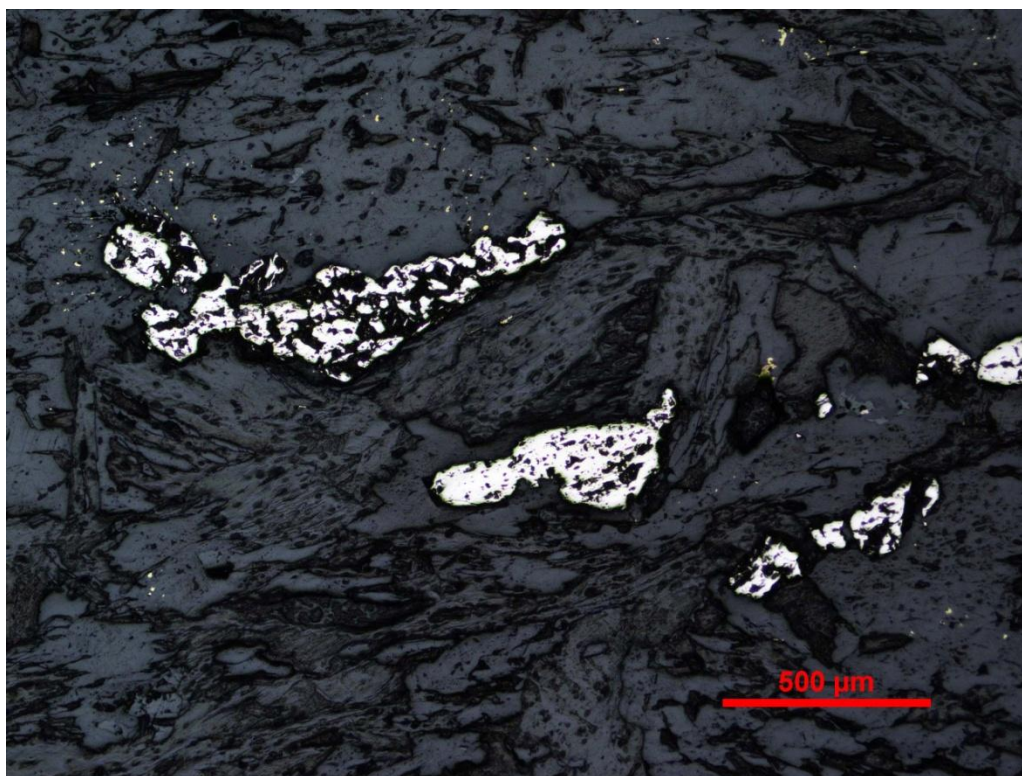


Sample CR-0002. Coarse biotite in quartz-plagioclase-biotite segregation band. Pyrite (tanish) is associated with chlorite and sericite. Top- plane light; Middle- crossed polarizers; Bottom- reflected light.

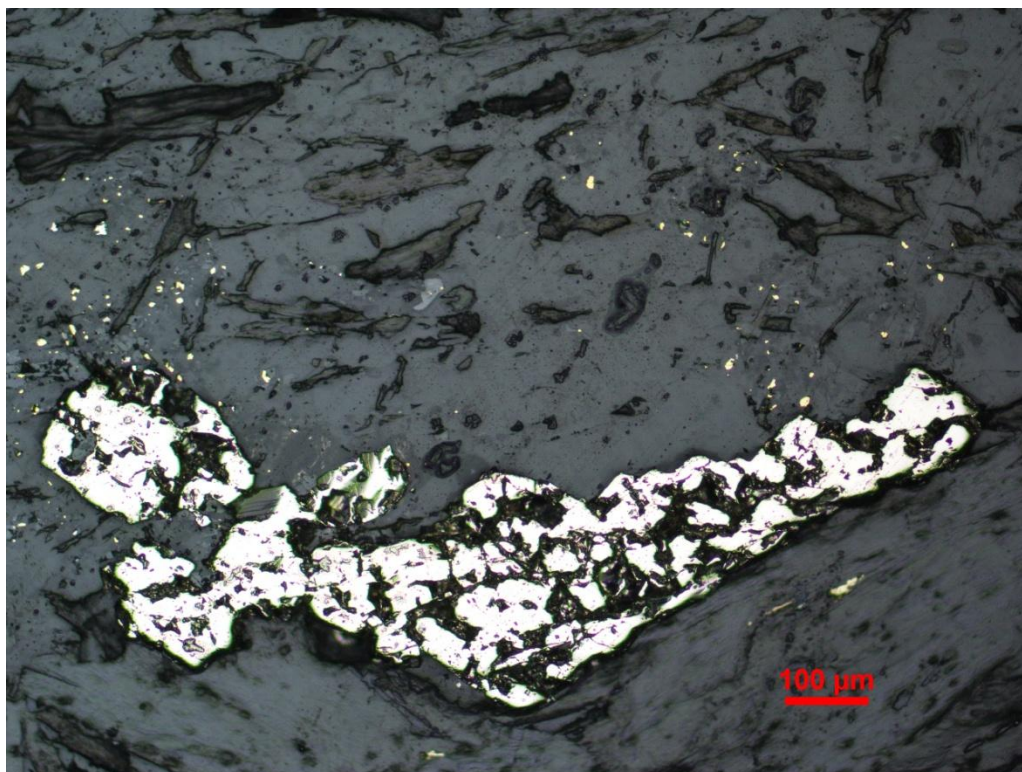






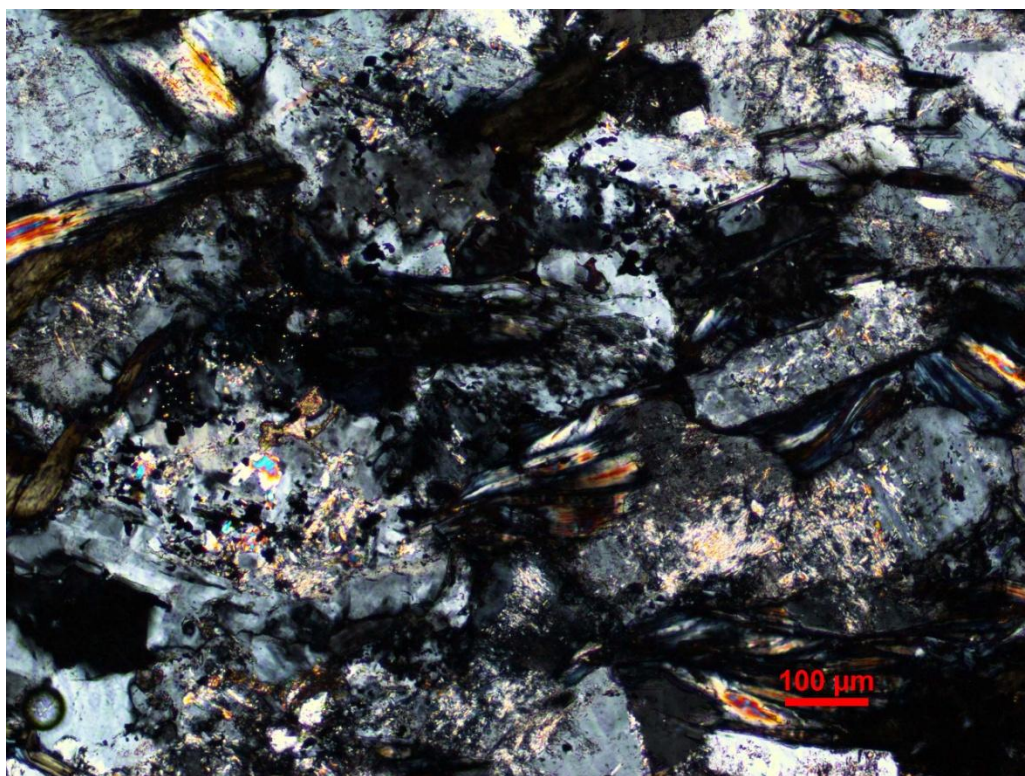
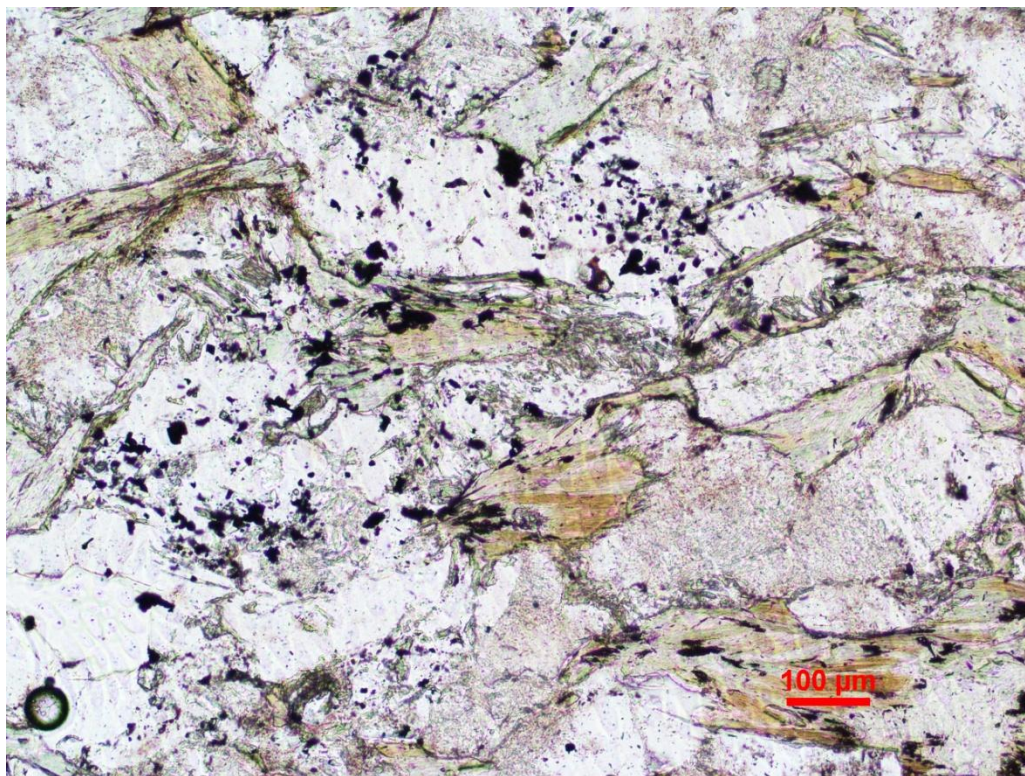


Sample CR-0002. Disseminated pyrite associated with chlorite after biotite and sericite after plagioclase. Note very fine chalcopyrite disseminated in sericitized plagioclase (see below). Top- plane light; Middle- crossed polarizers; Bottom- reflected light.

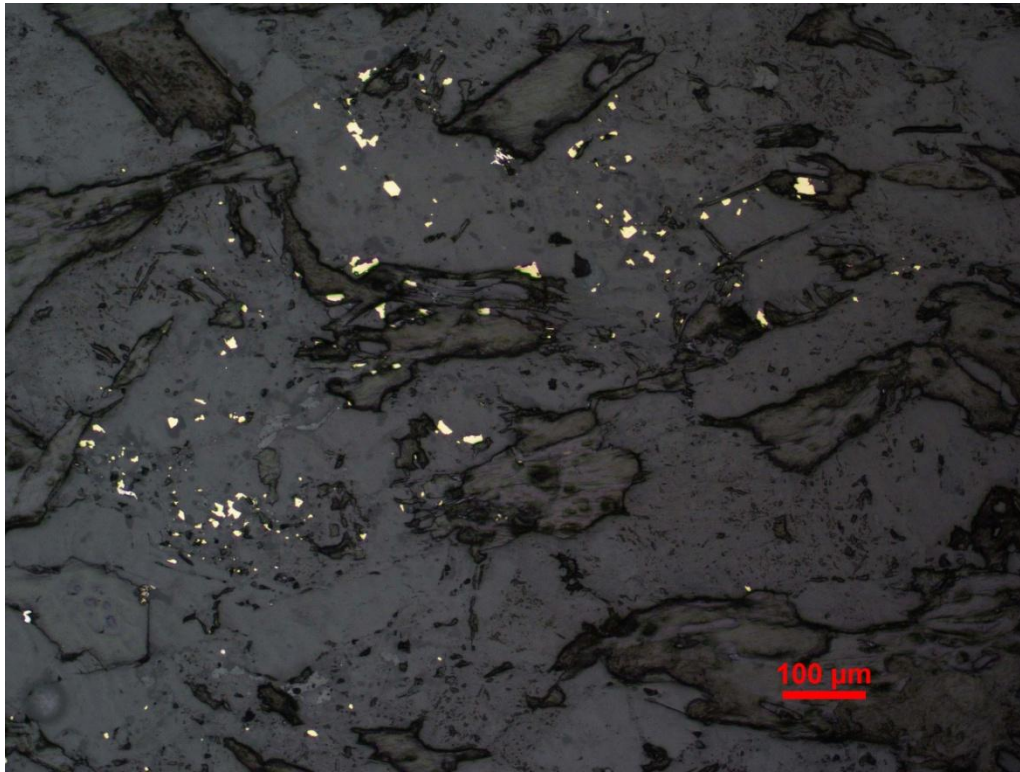


Sample CR-0002. Close up from above showing very fine disseminated chalcopyrite associated with sericitized plagioclase. Reflected light.









Sample CR-0002. Fine disseminated chalcopyrite in sericitized plagioclase and chloritized biotite.  
Top- plane light; Middle- crossed polarizers; Bottom- reflected light