

PETROGRAPHIC REPORT

CLIENT: Trevor Burr, AngloGoldAshanti
PROJECT/PROPERTY: CR STUDY
SAMPLE NUMBER: CR-0004

BY: James R. Shannon, Ph.D.
SAMPLE TYPE: Polished Thin Section
DATE: 17-July 2017

HAND SAMPLE DESCRIPTION: Small piece of core from 36.00 m. Light gray, very fine to medium grained, phenocryst-rich porphyro-aphanitic rock. With abundant 1 to 2 mm feldspar and quartz phenocrysts. Minor fine biotite. Cut by irregular quartz veinlets. The sample is nonmagnetic with a pencil magnet and there is no reaction to dilute HCl.

POLISHED-SECTION DESCRIPTION:

| MINERAL | EST % | COMMENTS |
|--------------------|-------------|--|
| PRIMARY | [98] | |
| PHENOCRYSTS | (54) | |
| Plagioclase | 48 | Subhedral phenocrysts up to 2.25 mm; albite and Carlsbad twinning; no zoning; Abundant brittle fractures disrupt crystals and grdmass infill fractures |
| Quartz | 6 | Anhedral, rounded phenocrysts up to 2.5 mm; very st undulatory extinction; Wk-mod recrystal |
| GROUNDMASS | (46) | Very fine grained (0.01 to 0.2 mm) quartz rich |
| | | |
| ACCESSORY | (Tr) | |
| Zircon | Tr | Trace subhedral grains as inclusions in plagioclase |
| METAMORPHIC | [2] | Very weak metamorphic overprint with fine green biotite; Locally along microveinlets with epidote; Local weak foliation |
| Biotite | 2 | |
| Epidote? | | |
| ALTERATION | (8) | |
| Epidote | 7 | Anhedral to subhedral grains up to 0.15 mm in breccia matrix and along irregular microveinlets; May be related to metamorphic overprint |
| Sericite | 0.5 | Weak sericite alteration of plagioclase phenocrysts |
| Leucoxene | 0.5 | Leucoxene alteration of Ti-bearing phase, probably ilmenite or rutile |
| VEINS | (1) | Irregular quartz veinlets 0.02 to 0.1 mm thick |
| Quartz | 1 | |
| SULFIDE | (Tr) | |
| Chalcoprite | Tr | Trace tiny (0.005 mm) inclusions in quartz next to disseminated epidote |

TEXTURES

The sample displays a well-developed, crowded porphyritic texture with abundant 1 to 2 mm, subhedral plagioclase and rounded quartz phenocrysts in a very fine grained, aphanitic groundmass. Plagioclase phenocrysts are blocky with albite and carlsbad twinning, but no

evidence of zoning. There is no evidence of K-feldspar and mafic phenocrysts. The groundmass appears to be quartz rich. There is a trace of subhedral accessory zircon, but no evidence of primary opaque phases.

The rock is locally shattered by micro-fault brecciation. Relationships with quartz veins suggest that recurrent faulting occurred before and after quartz veining. Quartz veinlets (0.02 to 0.1 mm thick) cut the porphyry and fault breccia. Late microfaults cut and offset quartz veinlets that cut fault breccia. Recurrent faulting is also indicated by angular clasts of fault microbreccia. Most of the fault breccia matrix has very fine grained epidote.

METAMORPHIC OVERPRINT

Minor, fine, green biotite is concentrated along irregular, discontinuous microveinlets. The green color suggests an unusual, non-igneous biotite composition. Minor epidote is associated with the biotite. The biotite has suggestions of weak-moderate, foliation alignment and is suspected to be related to metamorphic overprinting. Local association of epidote with biotite suggests epidote may be part of the metamorphic assemblage. The biotite-epidote assemblage suggests a low-medium grade of metamorphism, probably equivalent to upper greenschist-lower amphibolite facies.

ALTERATION/MINERALIZATION

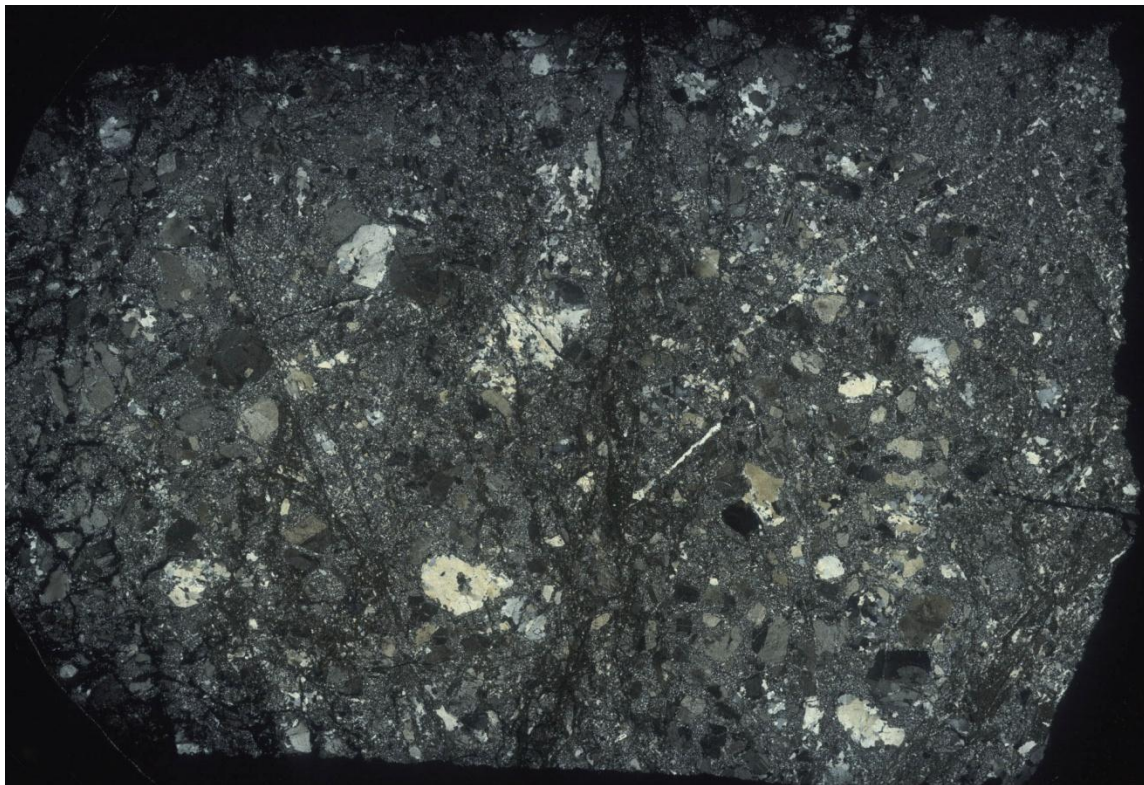
The sample has weak hydrothermal(?) alteration with weak sericite alteration/replacement of plagioclase phenocrysts. Green biotite is interpreted to be related to a metamorphic overprint. Epidote locally occurs with green biotite in microveinlets and is concentrated in fault breccia matrix. The sample is cut by numerous, irregular quartz veinlets, but is not mineralized. Weak sericite alteration may be associated with the quartz veining. There is a trace of fine disseminated chalcopyrite that is associated with quartz and epidote.

COMMENTS

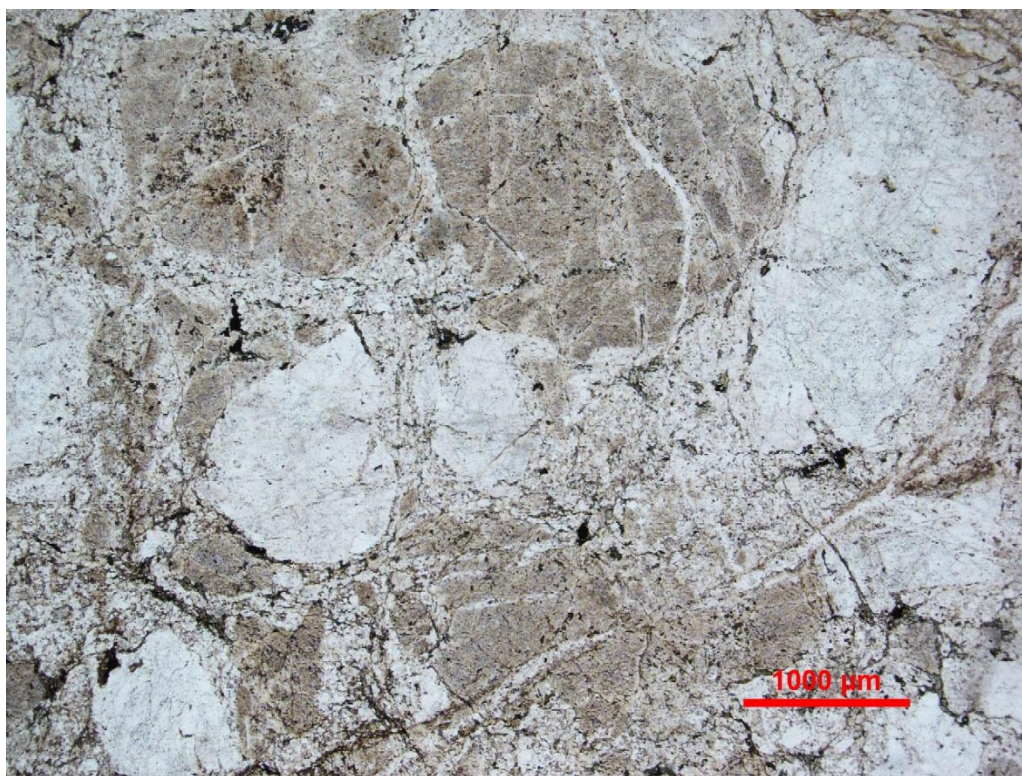
The sample has a very weak, subtle metamorphic overprint indicated by weakly foliated green biotite. Biotite appears to be concentrated along irregular fractures related to brittle faulting. Epidote is concentrated in fault breccia matrix. Paragenetic relations suggest that weak metamorphism and quartz veining were more or less synchronous with faulting.

ROCK NAME: Meta-Quartz Diorite Porphyry

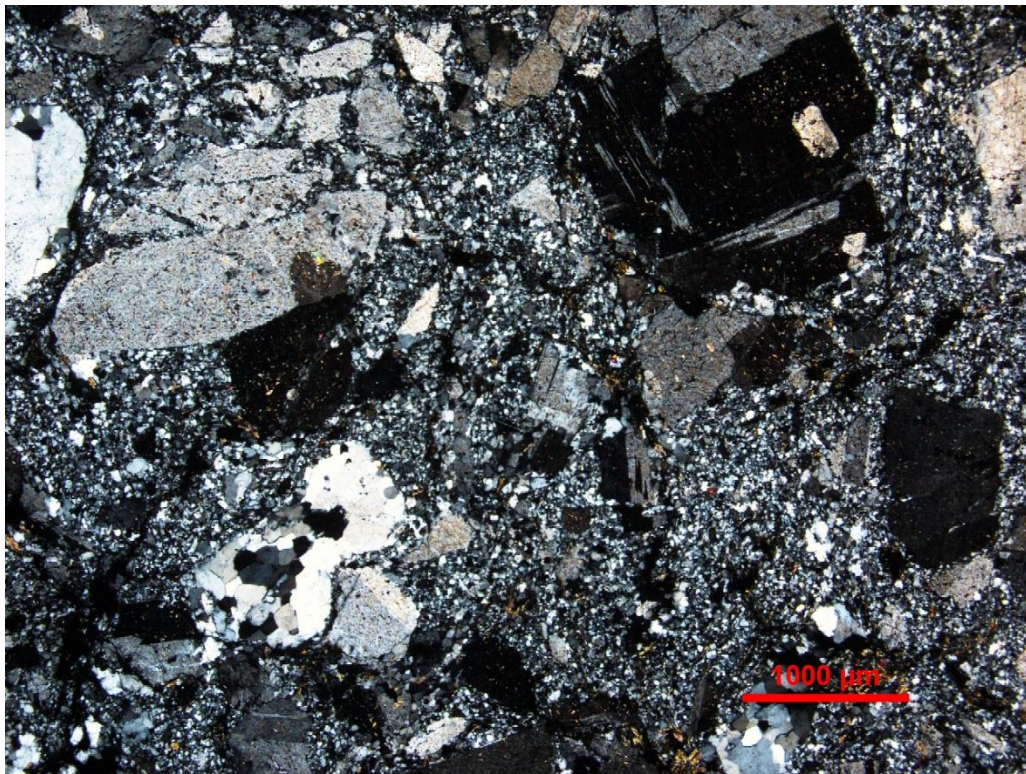
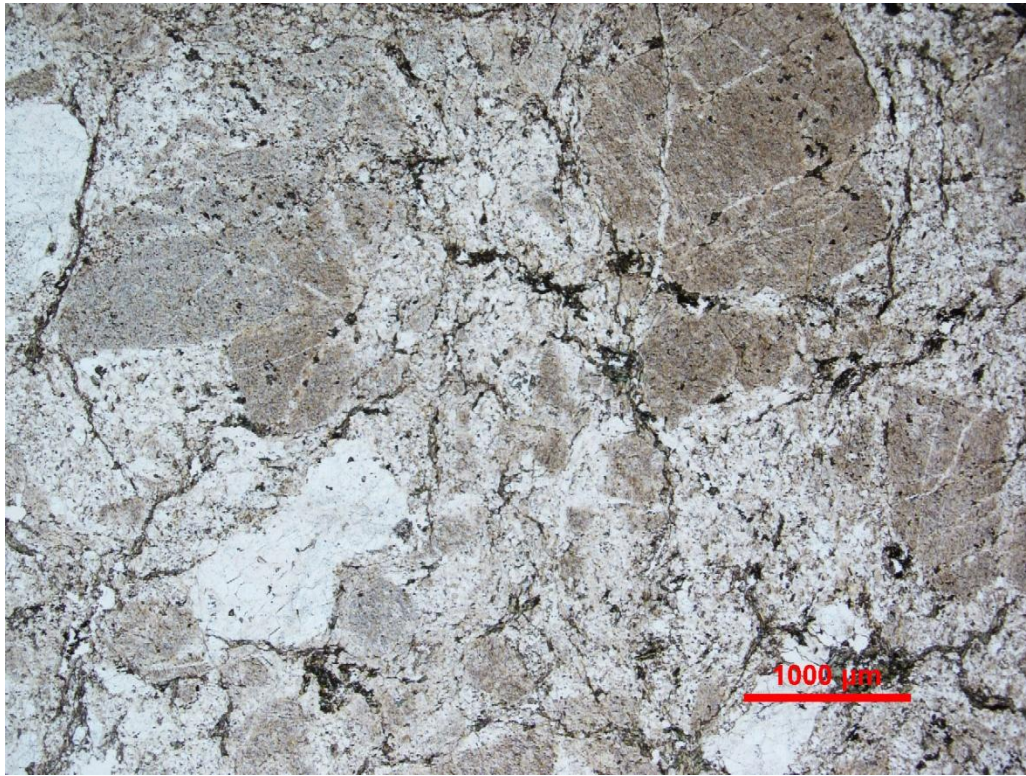
PROTOLITH: Quartz Diorite Porphyry

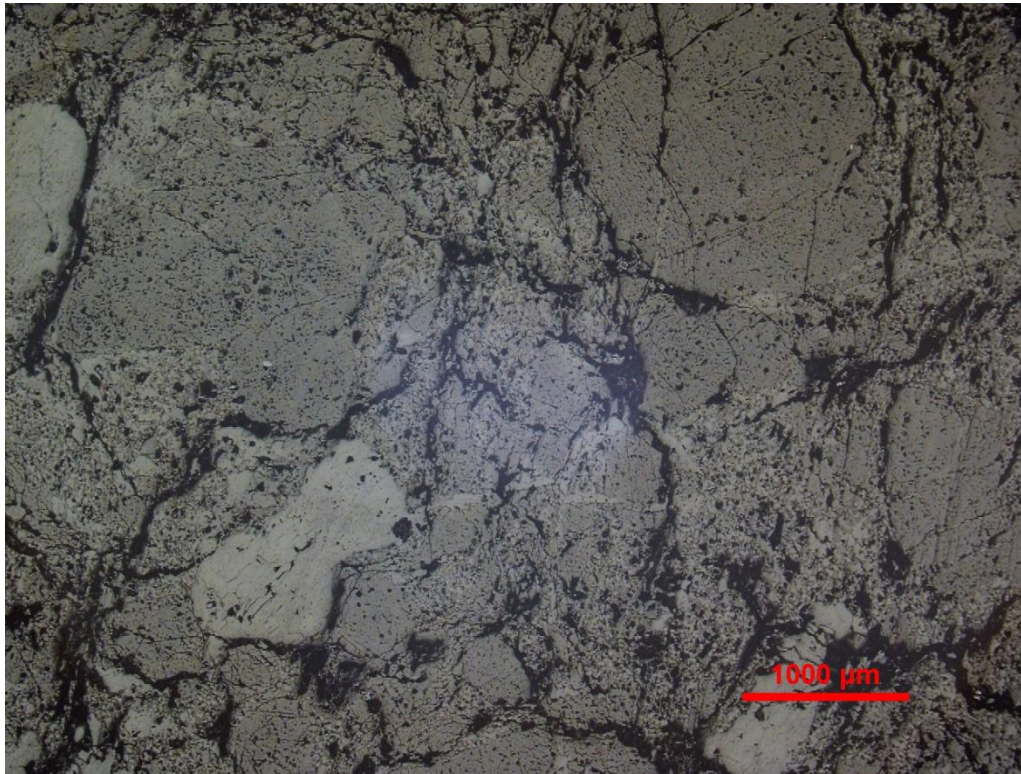


Sample CR-0004. Wide-field, full-thinsection view showing medium-coarse, crowded porphyritic rock with abundant plagioclase and quartz phenocrysts in very fine grained groundmass. Top- plane light; Bottom- crossed polarizers. 3.6 cm across.

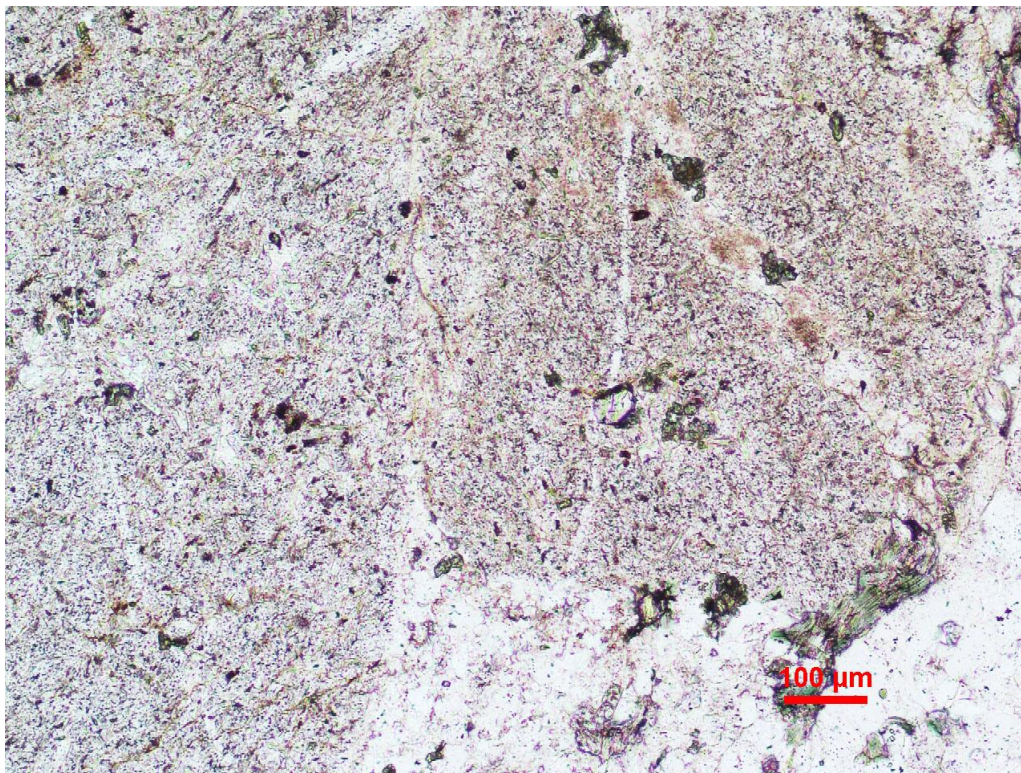


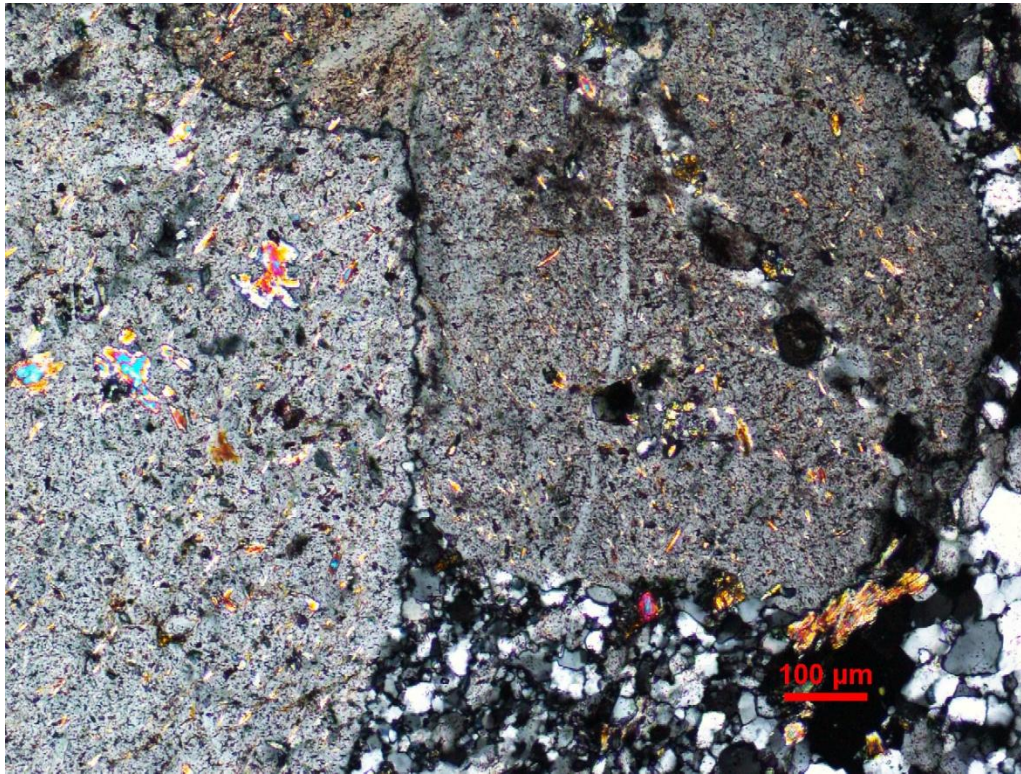
Sample CR-0004. Crowded, subhedral plagioclase (turbid) and rounded quartz phenocrysts in very fine grained groundmass. Note quartz phenocryst recrystallization (mosaics). Top- plane light; Bottom- crossed polarizers.





Sample CR-0004. Crowded porphyry cut by irregular quartz and epidote veinlets. Top- plane light; Middle- crossed polarizers; Bottom- reflected light.



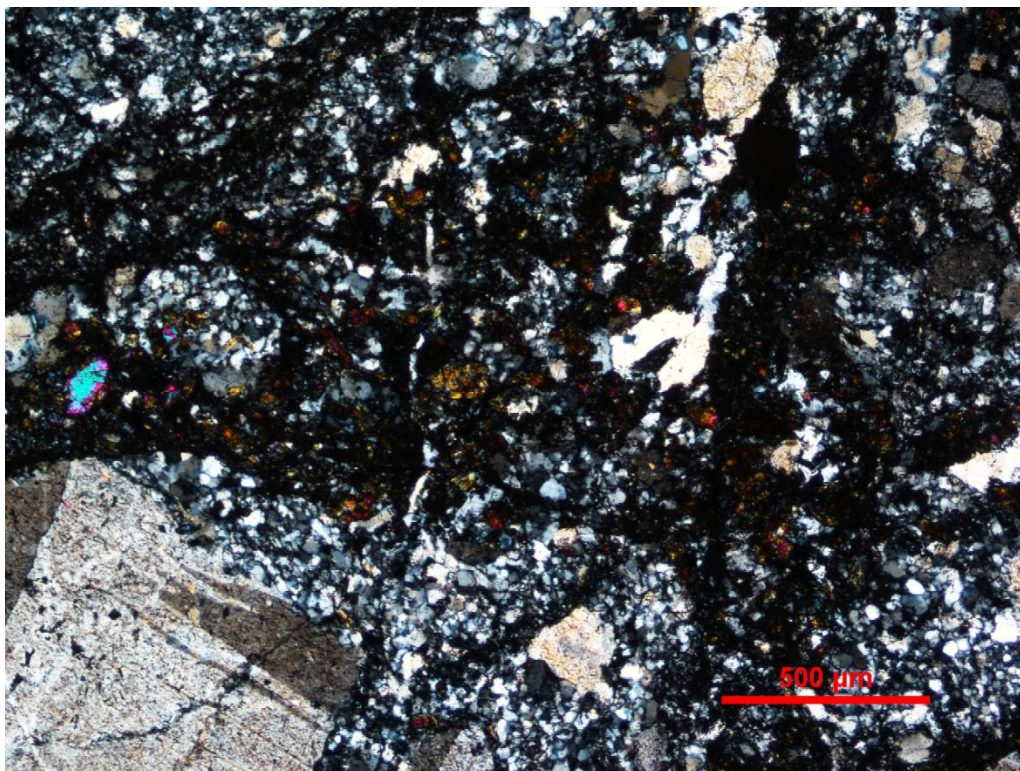


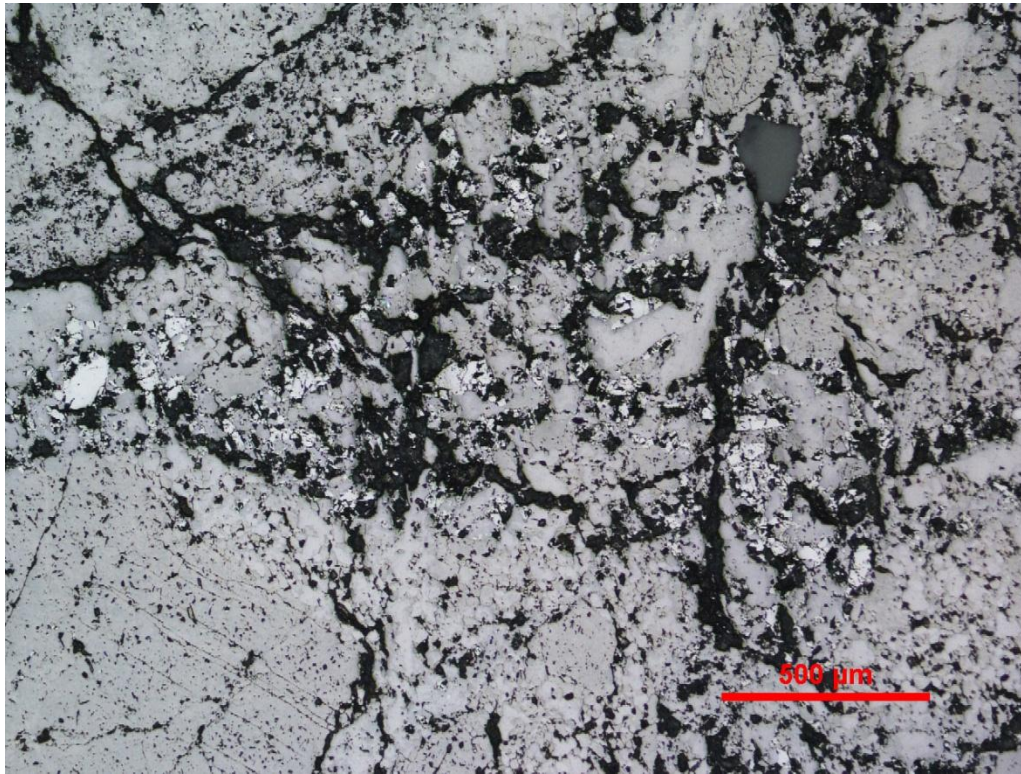
Sample CR-0004. Accessory zircon inclusion in plagioclase (center), metamorphic green biotite (lower right), and weak sericite alteration. Top- plane light; Bottom- crossed polarizers.





Sample CR-0004. Brittle fault breccia with fine epidote breccia matrix. Top- plane light; Bottom- crossed polarizers.





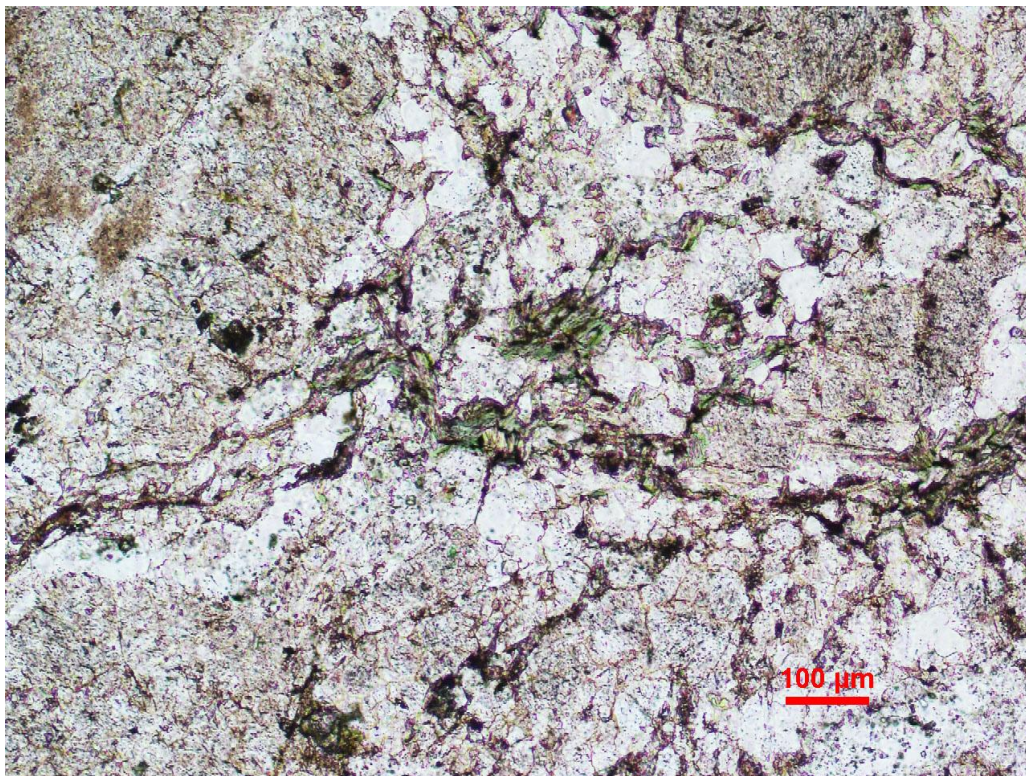
Sample CR-0004. Fine epidote (light gray reflectivity) fault breccia matrix. Top- crossed polarizers; Bottom- reflected light.

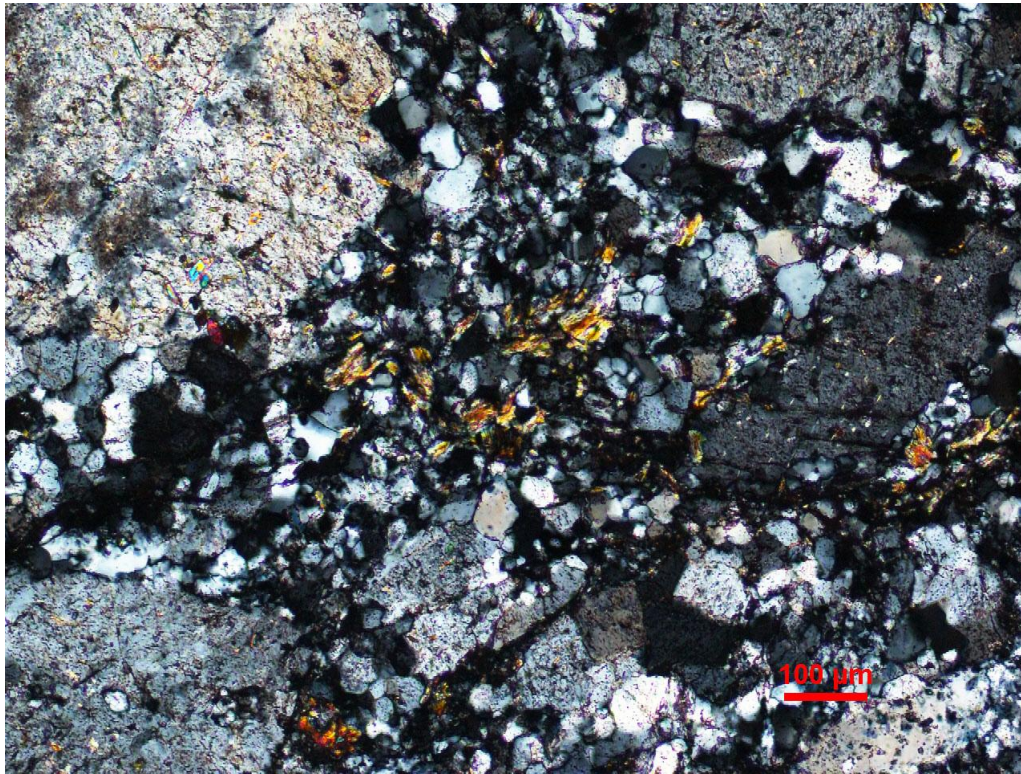


Sample CR-0004. Angular re-brecciated fault breccia fragments in fault breccia. Plane light.

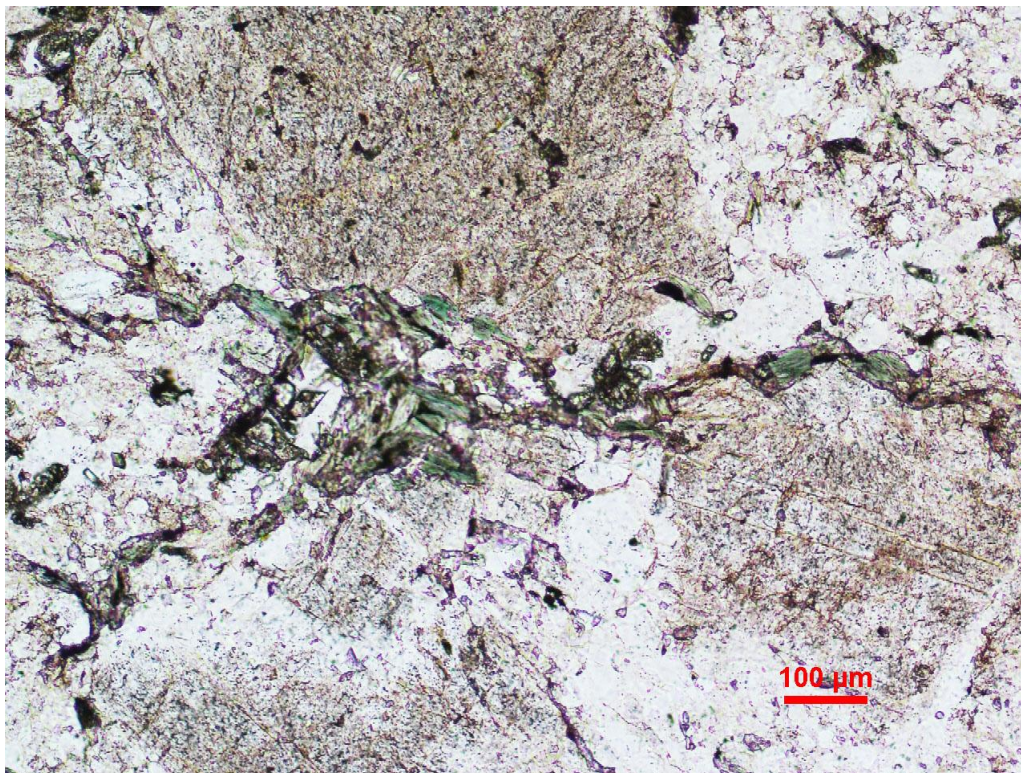


Sample CR-0004. Quartz veins cutting fault breccia and truncated by late fault (at right). Plane light.

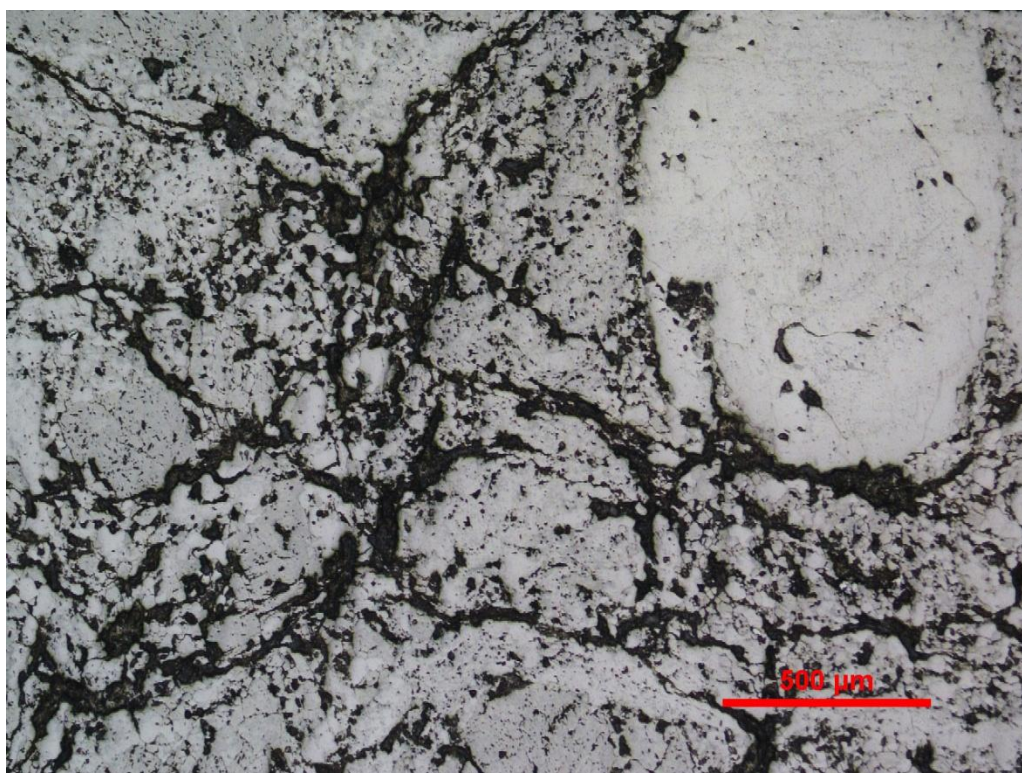
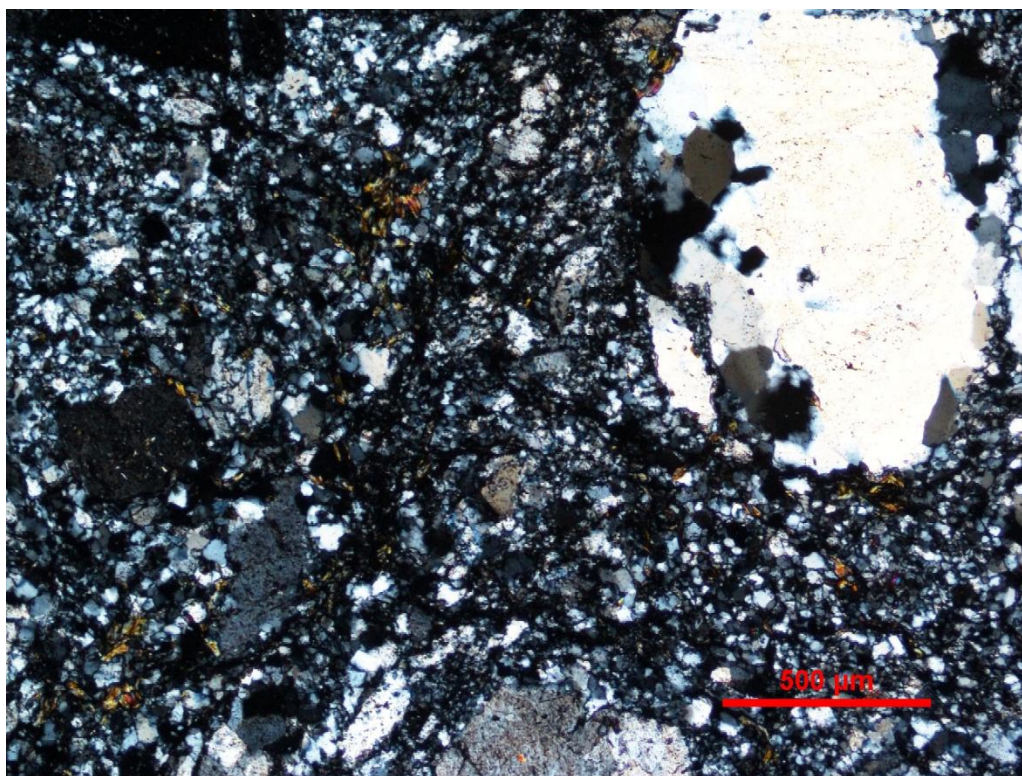




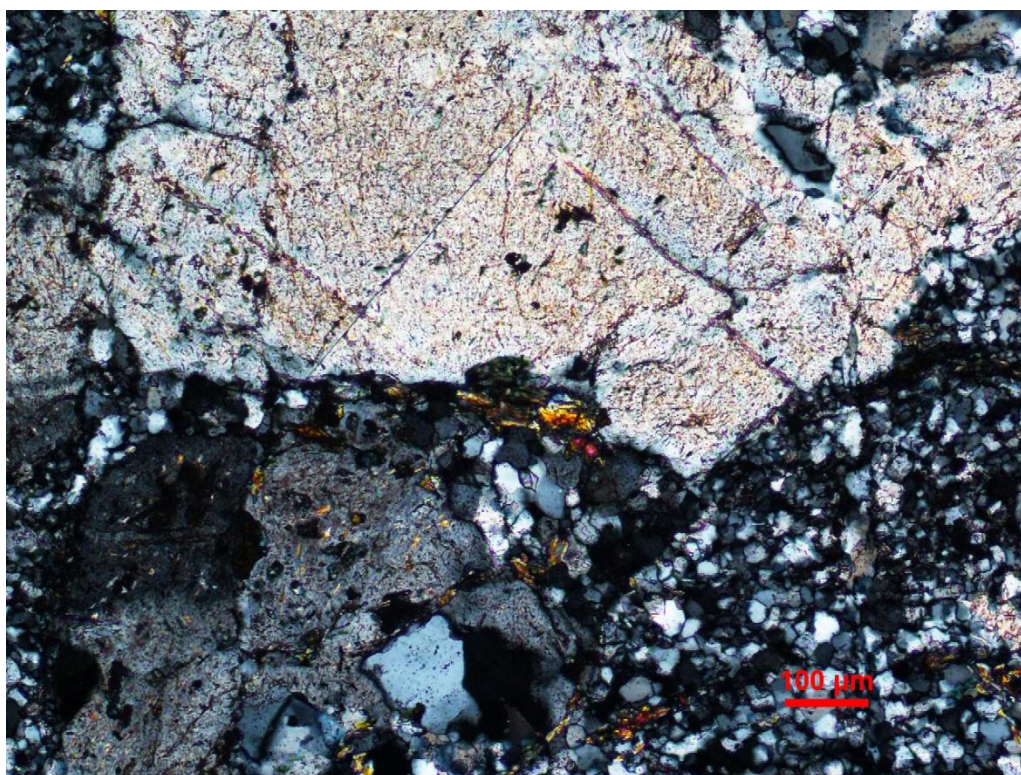
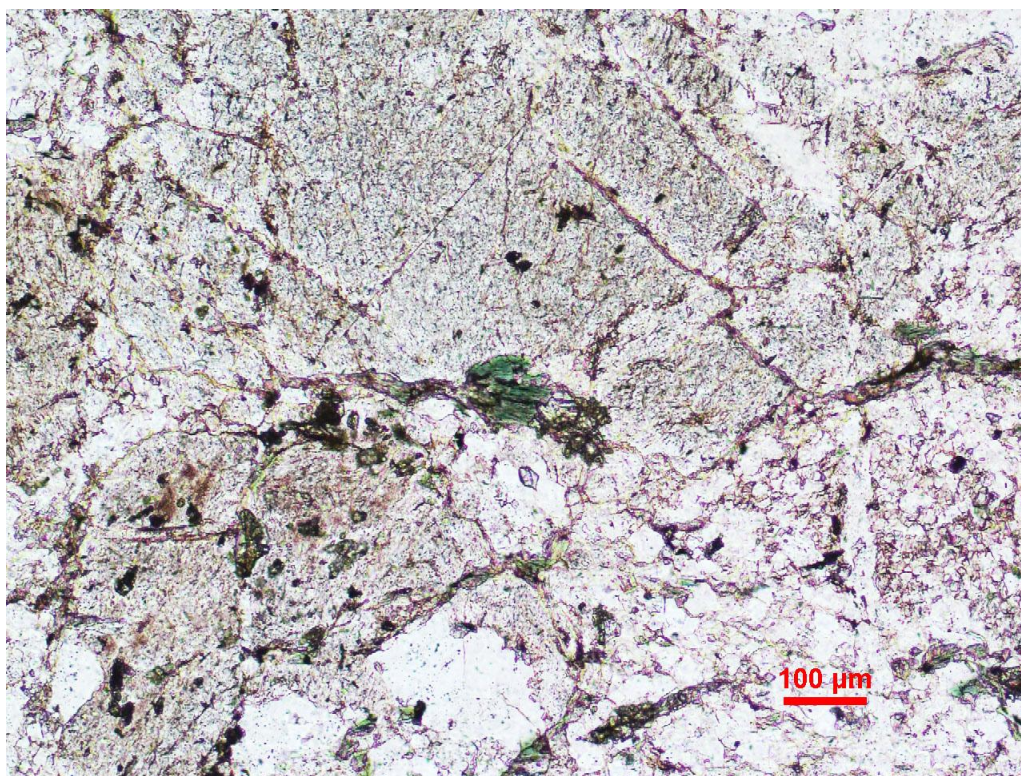
Sample CR-0004. Metamorphic(?) green biotite along irregular microveinlets. Note suggestions of weak foliation. Top- plane light; Bottom- crossed polarizers.



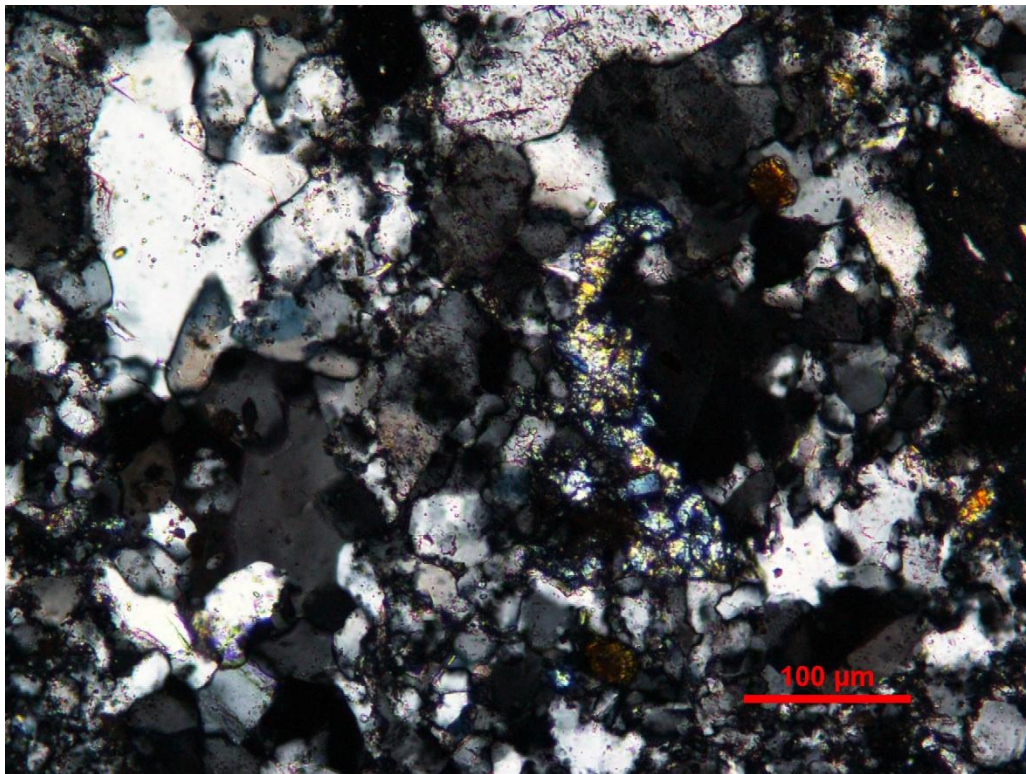
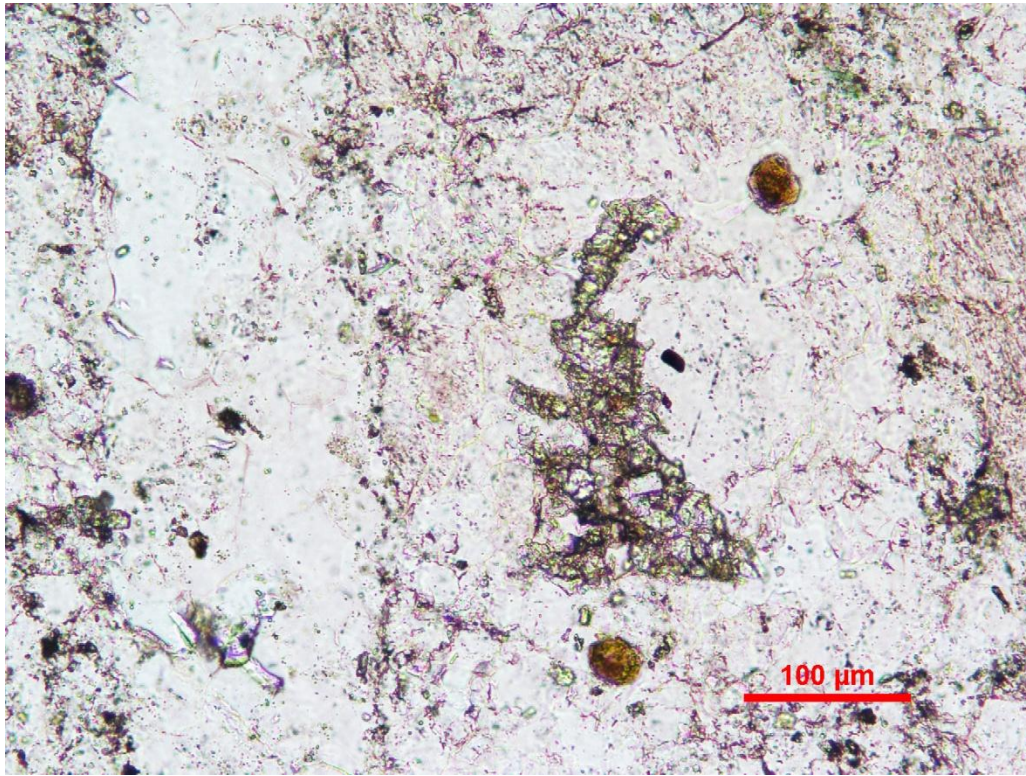
Sample CR-0004. Fine metamorphic green biotite along irregular microveinlets showing weak preferred foliation.

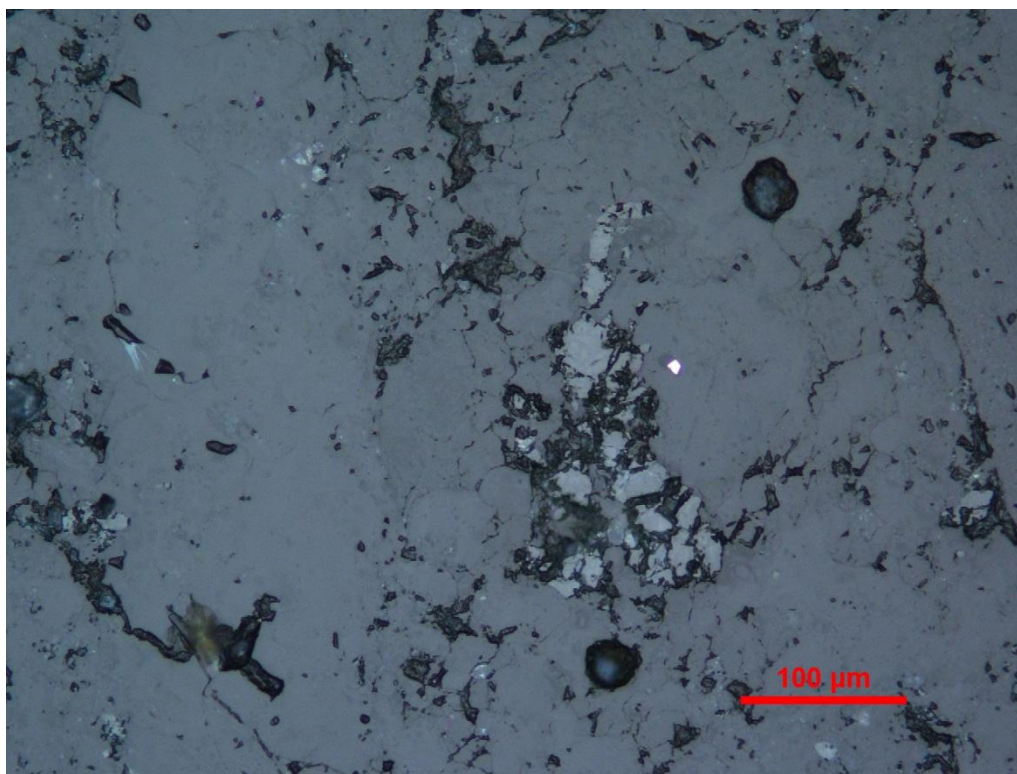


Sample CR-0004. Metamorphic(?) biotite along irregular microveinlets (low reflectivity). Top-crossed polarizers; Bottom- reflective light.



Sample CR-0004. Metamorphic(?) green biotite and epidote along irregular microveinlets. Top- plane light; Bottom- crossed polarizers.





Sample CR-0004. Tiny chalcopyrite inclusion in quartz next to disseminated epidote and quartz veinlet (left). Top- plane light; Middle- crossed polarizers; Bottom- reflected light.