Supplementary Information Item 7 (S7): Photomicrographs

Photomicrographs of selected map units (Table 1). All units with $^{40}Ar/^{39}$ geochronology are shown. PPL = plain polarized light, XPL = cross polarized light, hb = hornblende, plag = plagioclase, cpx = clinopyroxene, opx = orthopyroxene. GM = groundmass, WR = whole rock.

SANTA ROSALÍA NORTH:

(A) Map unit name: Mina Santa Teresa, trachyandesite lava dome, and andesite block-and-ash-flow tuffs and lavas; sample name: hb cpx trachyandesite lava dome interior (sample SR 08-6), XPL, field of view 6 mm. ^{40}Ar-^{39}Ar age of 13.08 ± 0.11 Ma (GM; Figs. 5, 8).

(B) Map unit name: Mina Santa Teresa, trachyandesite lava dome, and andesite block-and-ash-flow tuffs and lavas; sample name: Hb cpx andesite lava (sample SR 09-1). Field of view 6 mm, PPL (B-1) and CPL (B-2). Glomerocrysts of plagioclase and clinopyroxene set in a microlitic groundmass; hornblende is psuedomorphed by opaques forming black relict phenocrysts in plain polarized light with some relict birefringence in crossed polarized light. ^{40}Ar-^{39}Ar age of 13.21 ± 0.21 Ma (GM; Figs. 5, 8).

(C) Map unit name: Mina Victoria, andesite peperite intrusion, sample name: Hb cpx andesite peperite intrusion (sample PEP). Field of view 6 mm. The peperite intrusion is vesicular, with plagioclase set in a black groundmass of relict glass, and sparse clinopyroxene and lesser red hornblende. (C1) PPL: plag microlites in black groundmass with relict glass, irregular vesicles, and cpx phenocryst. (C2) CPL: red hb with opaque rims.

(D) Map unit name: Mina Victoria, trachyandesite lava dome; sample name: Hb cpx trachyandesite hypabyssal intrusion (sample SR 12-4). PPL (D-1) and XPL (D-2), field of view 6 mm. Cpx glomerocrysts and lesser altered hb phenocrysts in a groundmass of flow-aligned plag microlites and small altered interstitial hb. ^{40}Ar-^{39}Ar age of 13.81 ± 0.10 Ma (GM; Figs. 5, 8).

(E4F) Map unit name: Mina Victoria, thick andesite lavas; sample name: Hb cpx andesite lava (sample SR 12-2). CPL, field of view 6 mm. Fresh cpx and altered hb phenocrysts in a groundmass of microlitic flow-aligned plag. ^{40}Ar-^{39}Ar age of 10.1 ± 0.9 Ma (GM; Figs. 5, 8).

(F) Map unit: East of Curuglu fault, basaltic andesite to andesite tuff of Curuglu, sample name: cpx basaltic andesite ignimbrite (sample SR 08-2). PPL, field of view 4 mm. Vitroclastic texture: brown relict glass with microlites has vesicles and partial bubble walls. Clear minerals are plagioclase.

(G) Map unit: east of Curuglu fault, andesite lava; sample name: hb cpx andesite lava (sample SR 08-4). CPL, field of view 6 mm. ^{40}Ar-^{39}Ar age of 10.83 ± 0.95 Ma (GM; Figs. 5, 8).

(H) Map unit name: El Morro, Pink nonwelded lithic rhyolite to trachydacite ignimbrite; sample name: Trachydacite nonwelded lithic pumice lapilli tuff (sample SR 15-5). PPL, field of view 6 mm. Pumice-rich, lithic-poor uppermost part of the pink non-welded ignimbrite: aphyric pumice lapilli tuff with bubble-wall shards. Center of photo is an angular welded ignimbrite lithic clast.

(I) Map unit name: El Morro, Pink nonwelded lithic rhyolite to trachydacite ignimbrite; sample name: nonwelded rhyolite lithic ignimbrite (sample El Morro). XPL, field of view 6 mm. (1) Well-preserved uncompacted pumice and bubble-wall shards, with plagioclase phenocrysts in the tuff matrix, but not in the pumices. This suggests crystal enrichment occured during eruption and transport of the pink non-welded ignimbrite. (2) Volcanic lithics, which are abundant in the pink nonwelded ignimbrite.

(J) Map unit name El Morro: Basaltic trachyandesite lavas interstratified with the pink nonwelded lithic ignimbrite; sample name: basaltic trachyandesite lava (sample SR 15-8). PPL, field of view 6 mm. Plag (clear) and cpx (pale green) phenocrysts in a felted plag microlite groundmass. Many of the plagioclases have sieve textures (shown here on rims). Secondary hematite (blackish red), pseudomorphed after hb. ^{40}Ar-^{39}Ar age of 9.69 ± 0.12 Ma (GM; Figs. 5, 8).

(K) Map unit name: El Morro, purple welded rhyolite ignimbrite, sample name: aphyric, lithic-free rhyolite welded ignimbrite (sample SR 15-4). PPL, field of view 6 mm. Compacted pumice, and sintered and flattened bubble-wall shards. Opaque mineral may be hematite replacement of part of a pumice.

(L) Map unit name: Cerro Juanita, basaltic andesite lava; sample name: phenocryst-poor basaltic andesite lava (sample SR 14-1). CPL, field of view 6 mm. Unaltered plagioclase microlites. Phenocrysts are so few that any one 6 mm field of view has only one

phenocryst, of plag or altered hb or cpx. This field of view shows a cpx phenocryst. ^{40}Ar-^{39}Ar age of 9.66 ± 0.21 Ma (WR; Figs. 5, 8).

(M) Map unit name: Cerro Sombrero Montado, lithic pumice lapilli tuff; sample name: hb lithic pumice lapilli tuff (sample SR 14-4). PPL (1) Field of view 6 mm: well-preserved pumice shreds and bubble-wall shards and plagioclase crystals. Volcanic rock fragment in lower right corner. (2) Field of view 4 mm; unaltered broken pleochroic hb crystals.

(N) Map unit name: Cerro Sombrero Montado, andesite lava; sample name: phenocryst-poor andesite lava (sample SR 14-5). Field of view 5 mm, XPL. Plagioclase microlite groundmass with interstitial very small cpx. ^{40}Ar-^{39}Ar age of 8.84 ± 0.16 Ma (WR; Figs. 5, 8).

SANTA ROSALÍA SOUTH

(O) Map unit name: Santa Rosalía south, calcalkaline andesite lavas, sample name: crystal-rich cpx andesite lava (sample SL08-4). Field of view 5 mm, CPL. Abundant plag phenocrysts and lesser cpx phenocrysts. ^{40}Ar-^{39}Ar age of 10.11 ± 0.14 Ma (GM; Figs. 5, 8).

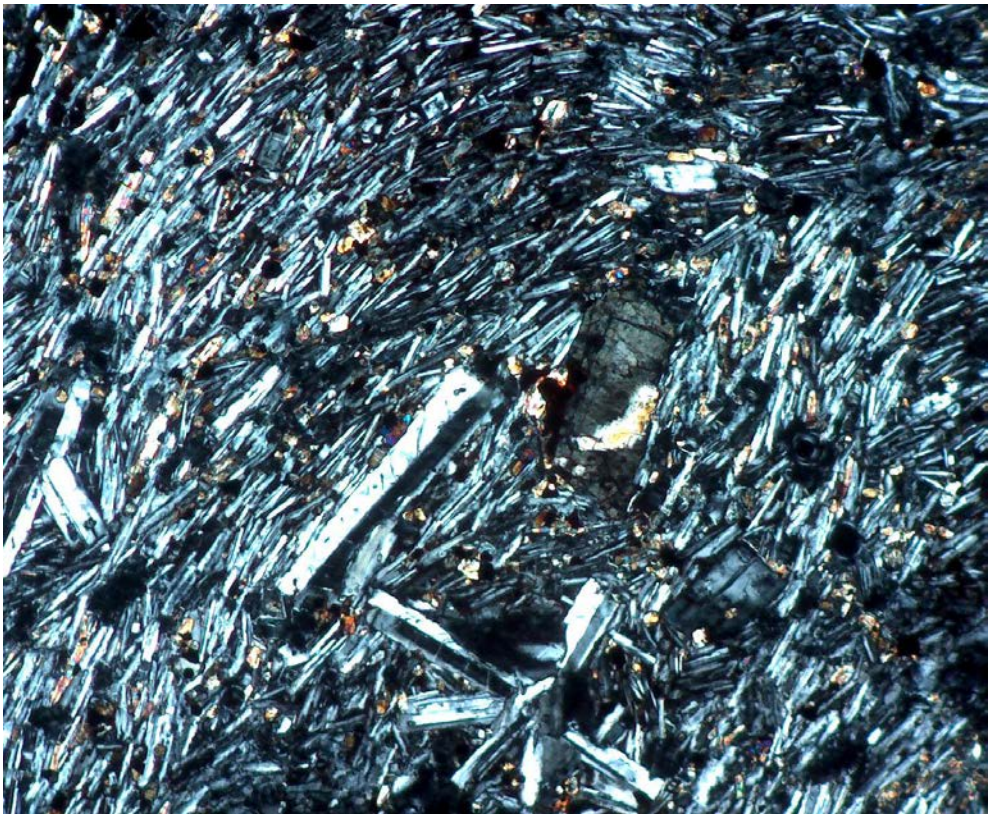
(P) Map unit name: Santa Rosalía south, calcalkaline andesite block-and-ash-flow tuffs, sample name: crystal-rich andesite block-and-ash-flow tuff (sample (SL 10-3). Field of view 4 mm, PPL. Abundant plag phenocrysts and glomerocrysts, and pale green euhedral cpx in glomerocrysts.

(Q) Map unit name: Santa Rosalía south, calalkaline dacite block-and-ash-flow tuff; rock name: plagioclase porphyry hb dacite block-and-ash-flow tuff (sample 12-3). Field of view 5 mm, PPL. Abundant plagioclase phenocrysts, some with sieve texture. Sparse hb phenocrysts are largely replaced by opaques, and small rectangular crystals are probably hb entirely replaced by opaques.

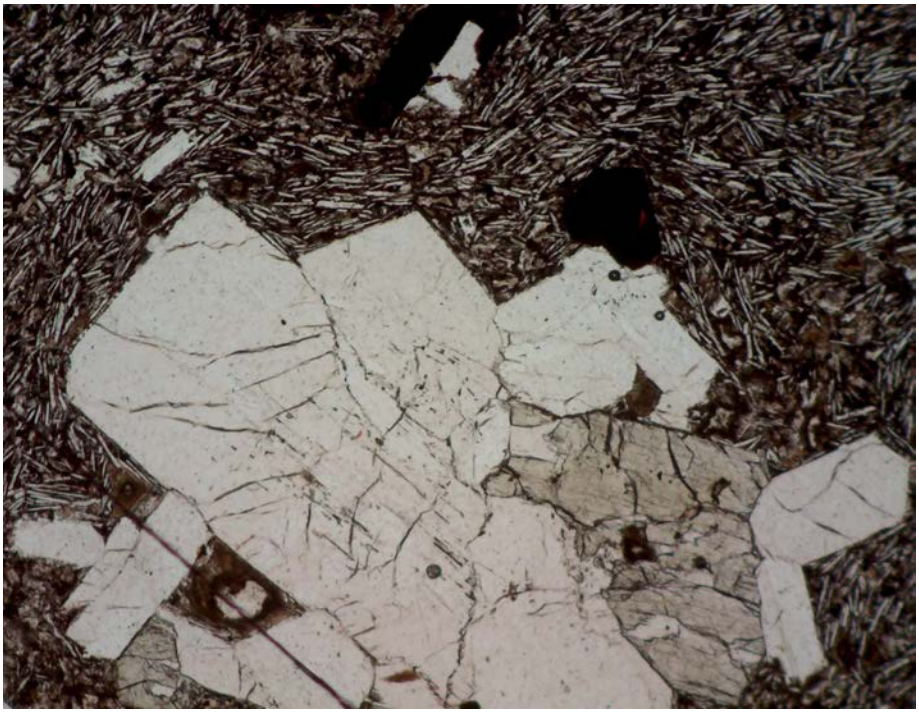
(R) Map unit name: Santa Rosalía south, high-magnesian andesites; rock name, hb cpx high-magnesian trachyandesite lava (sample SL08-7). Field of view 4 mm, PPL. Cpx phenocrysts and glomerocrysts, and hb psuedomorphed by opaque mineral.

(S) Map unit name: High-magnesian andesites; sample name: cpx hb high-magnesian trachyandesite hypabyssal intrusion (sample SL08-1). Finely-zoned hornblende

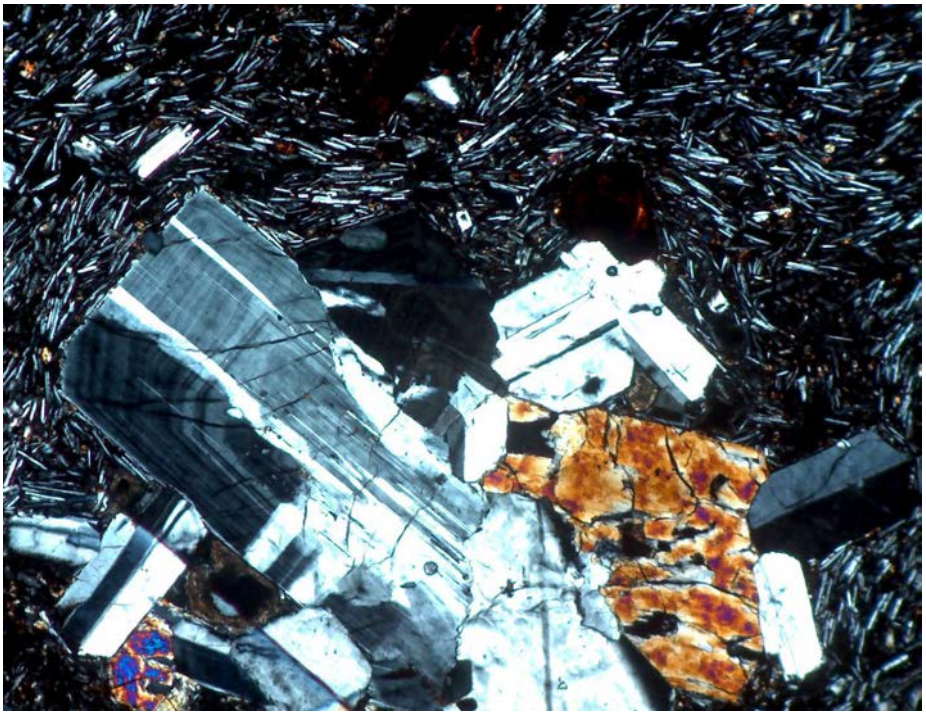
phenocryst with thin opaque rim. Field of view 2 mm (1) PPL, (2) XPL. ^{40}Ar-^{39}Ar age of 6.06 ± 0.27 Ma (HB); 5.92 ± 0.29 Ma (GM; Figs. 5, 8).



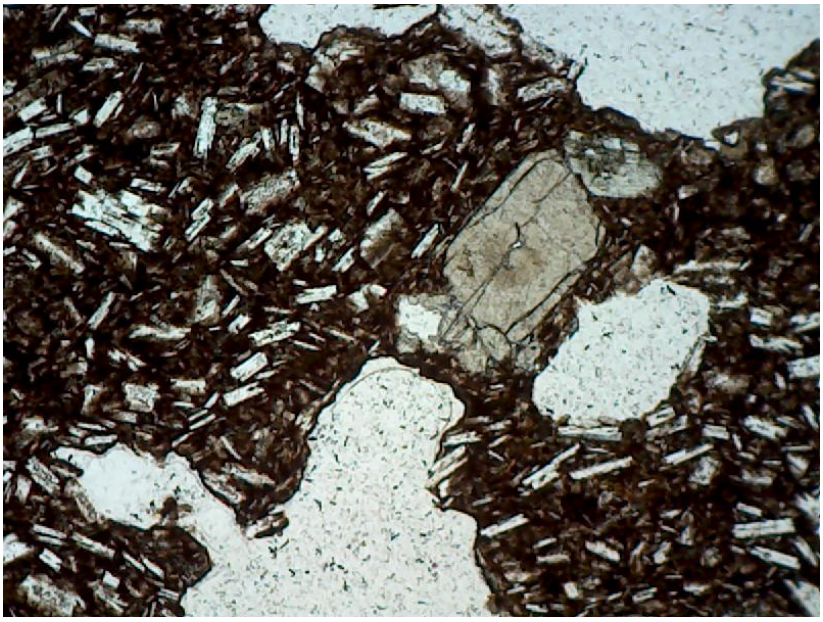
S7A



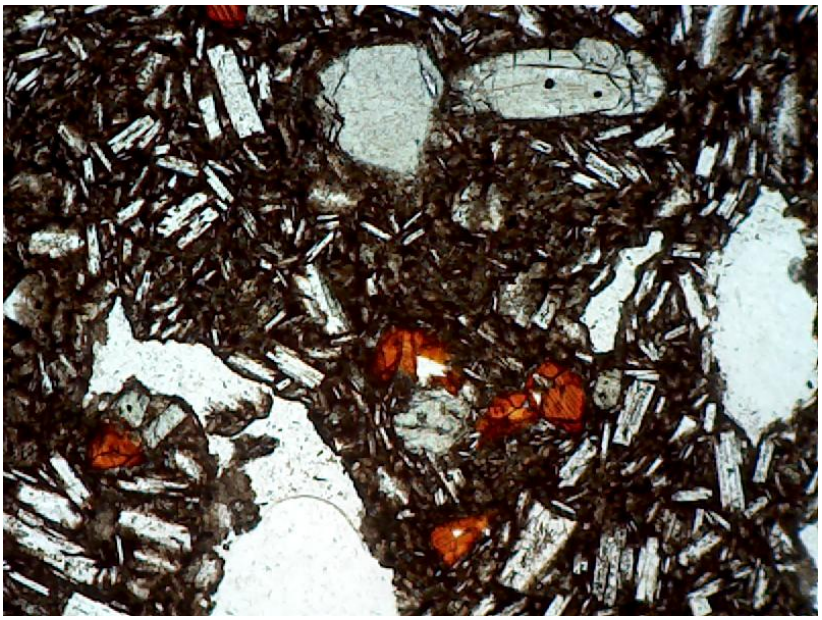
S7B-1



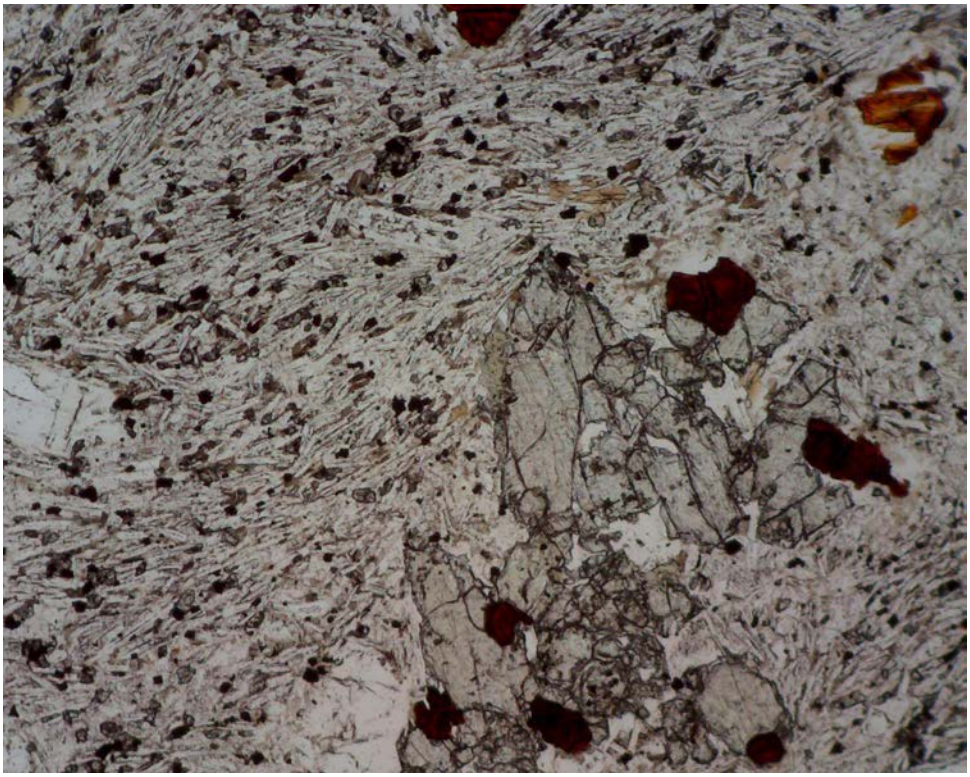
S7B-2



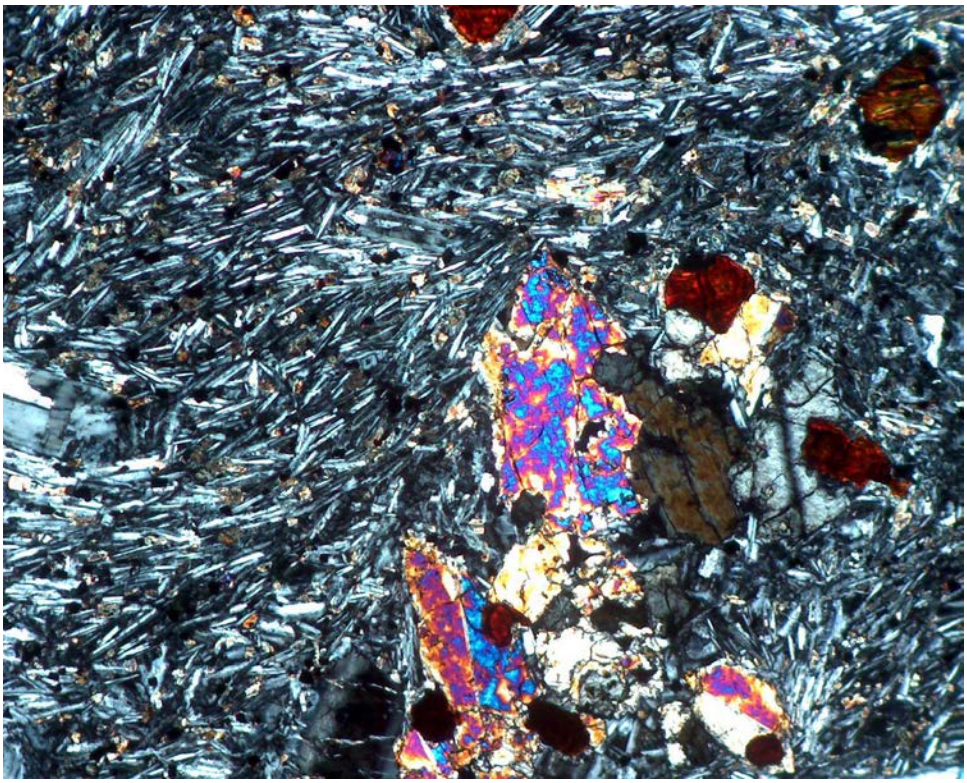
S7C-1



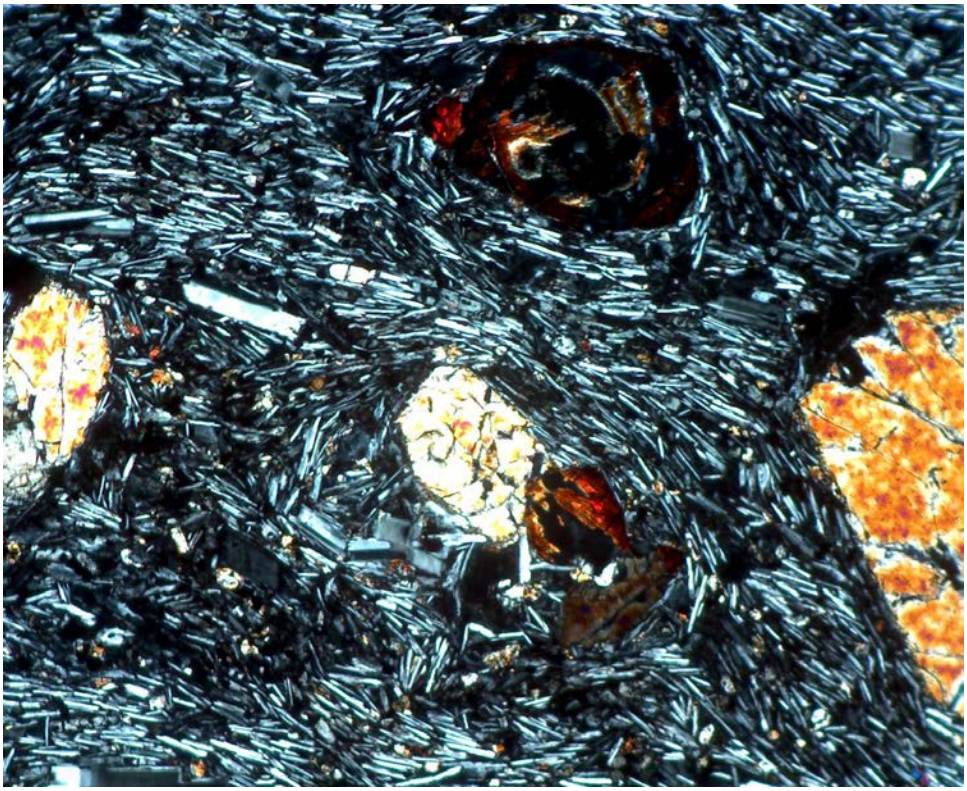
SI7C-2



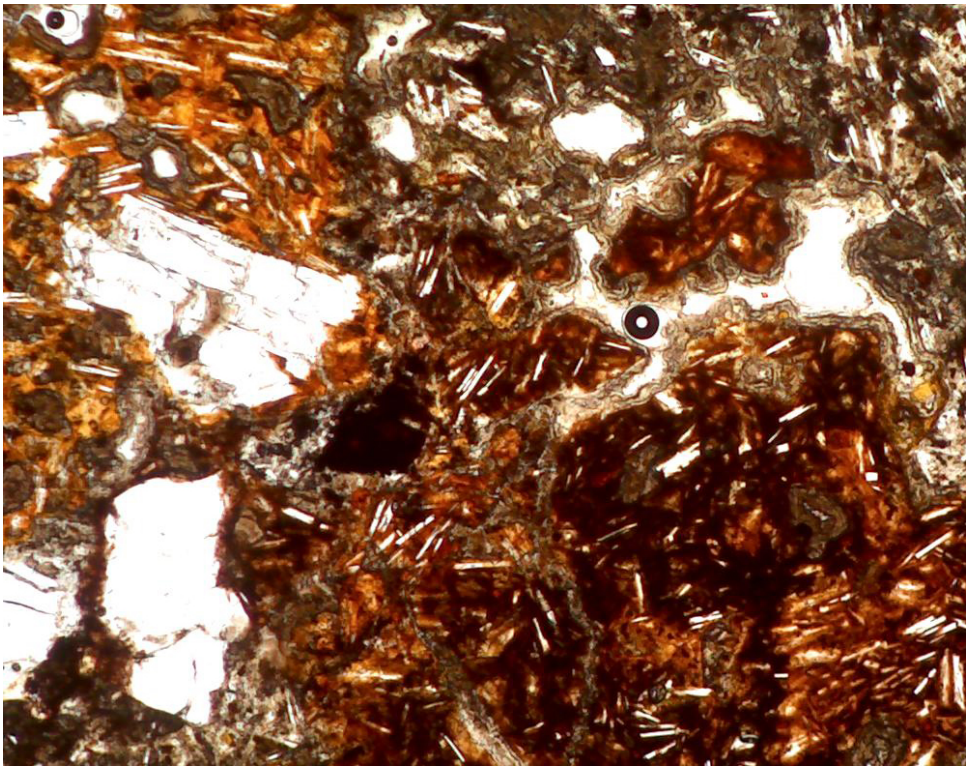
S7D-1



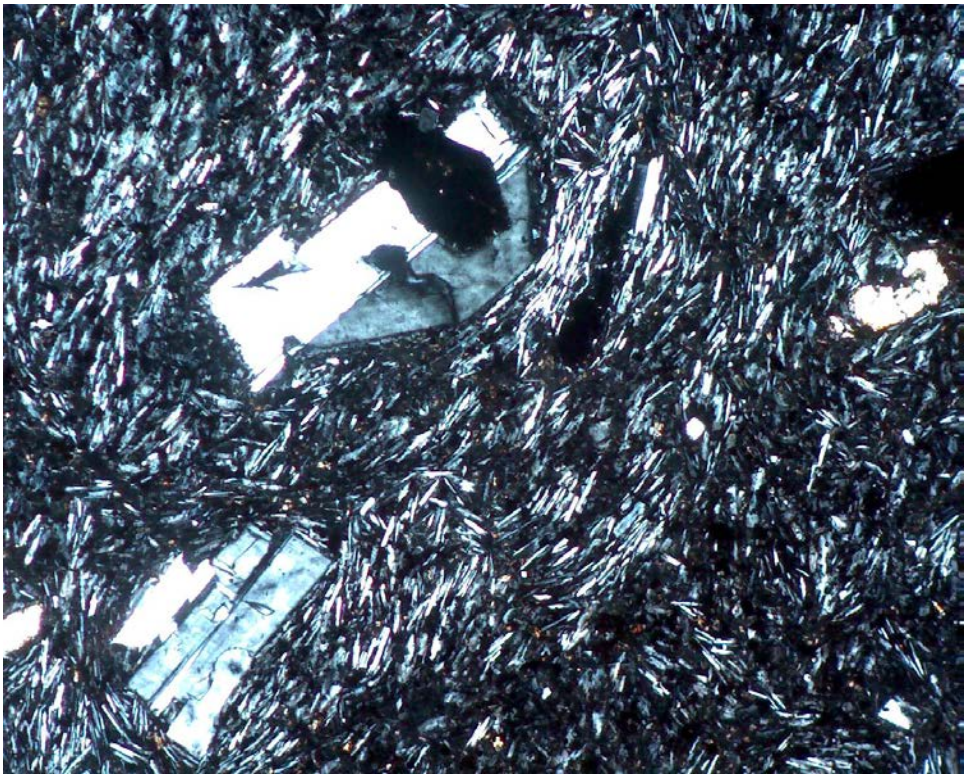
S7D-2



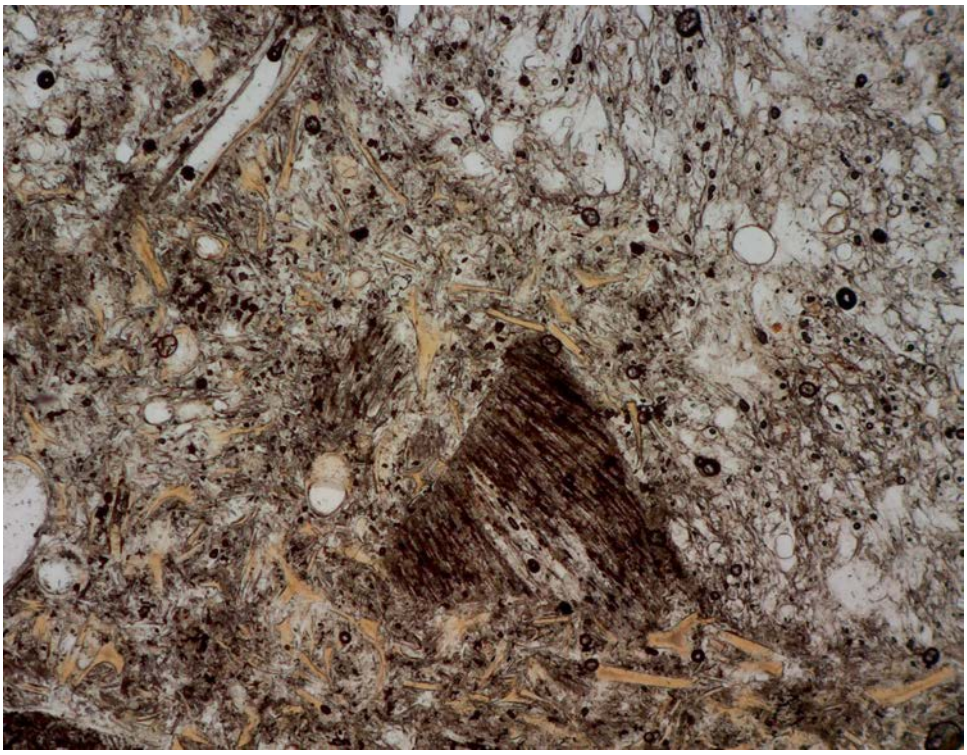
S7E



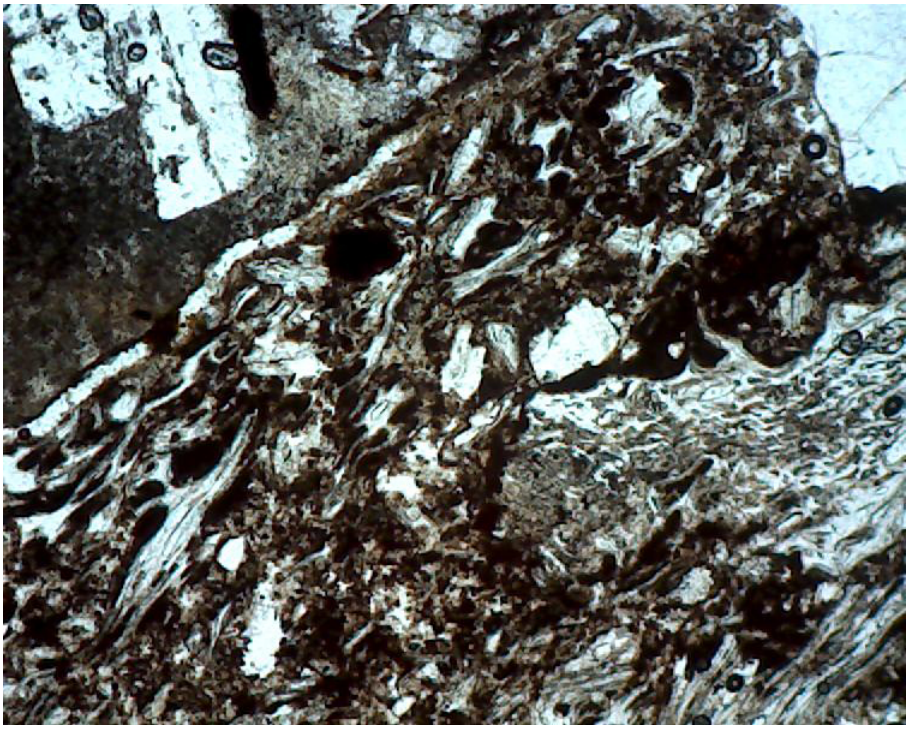
S7F



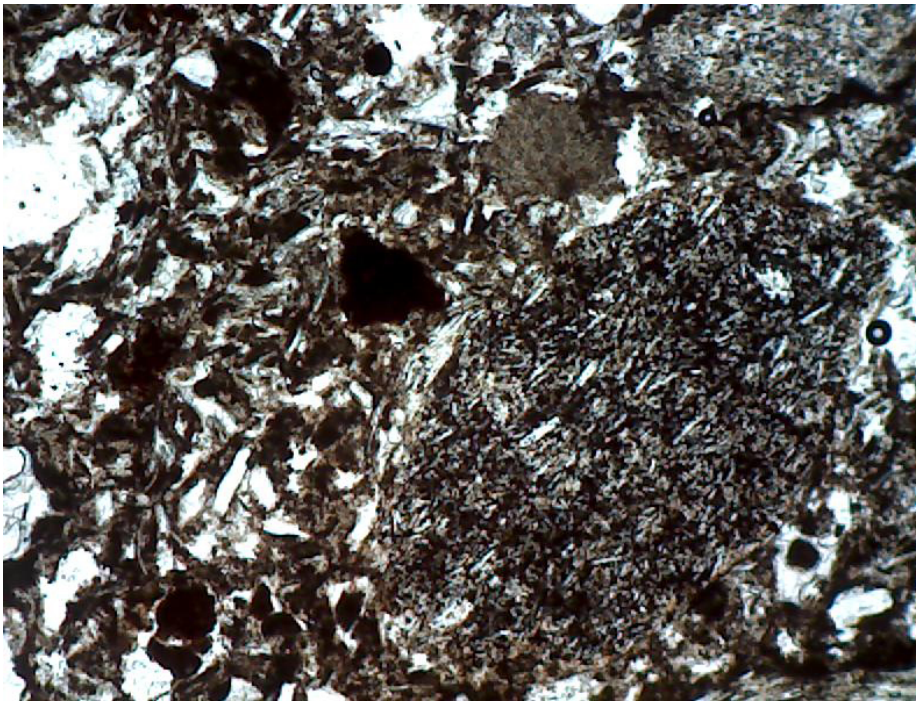
S7G



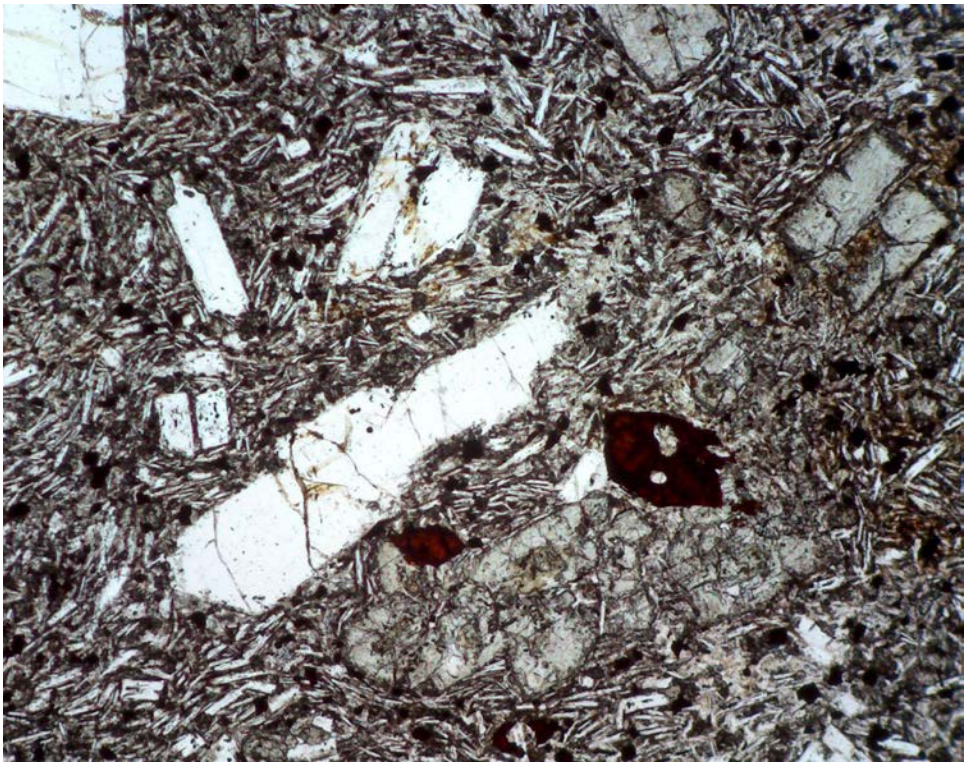
S7H



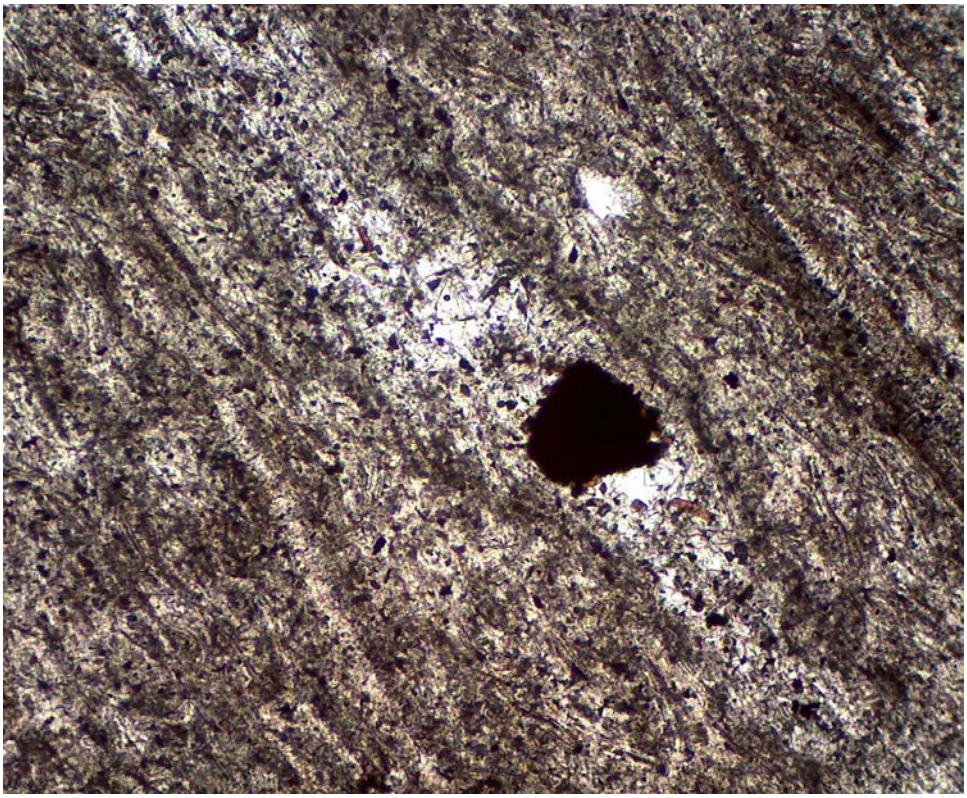
S7I-1



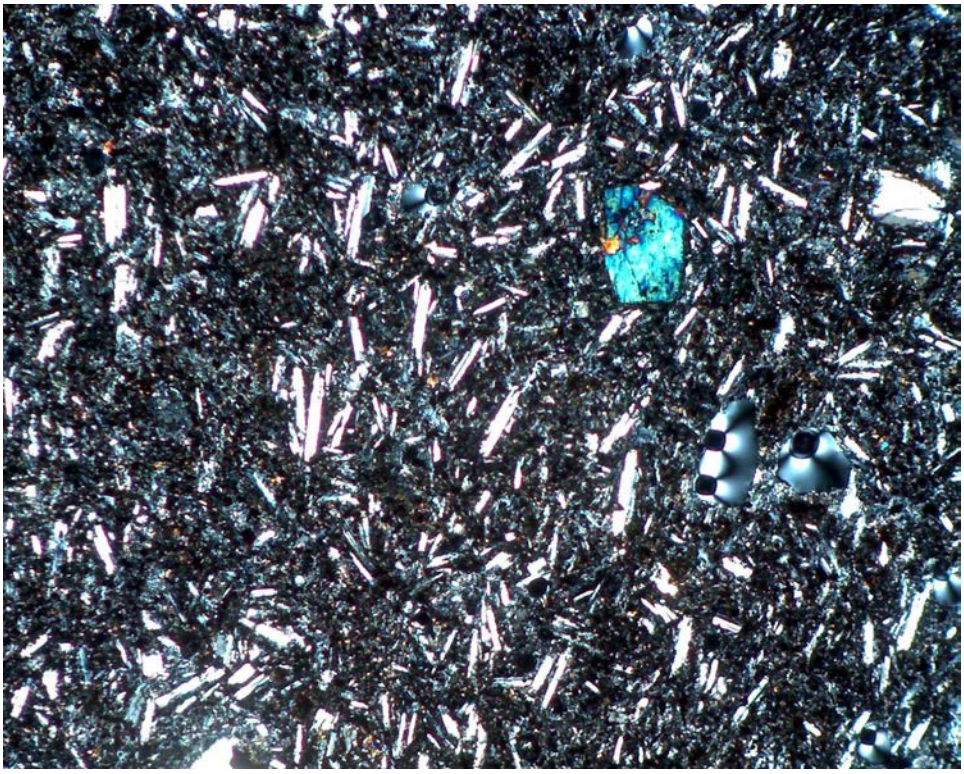
S7I-2



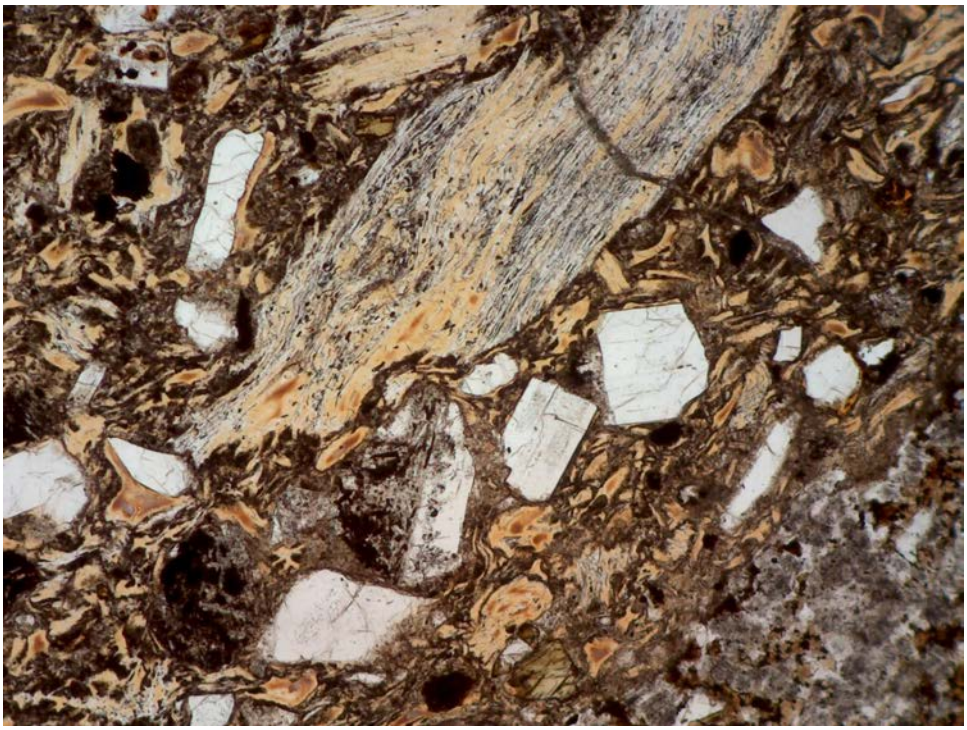
S7J



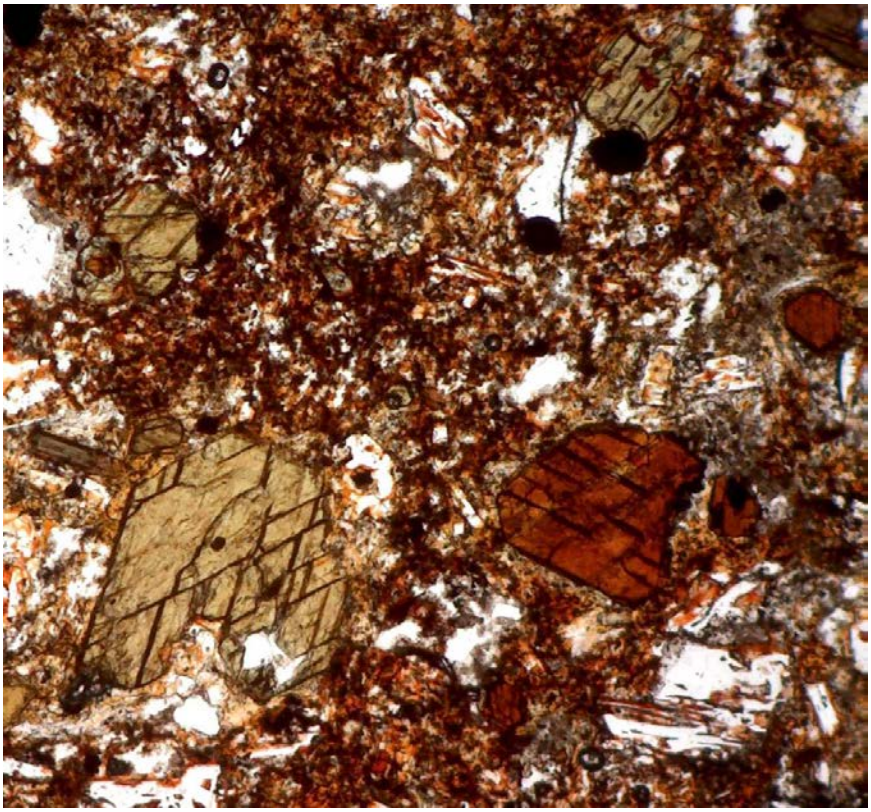
S7K



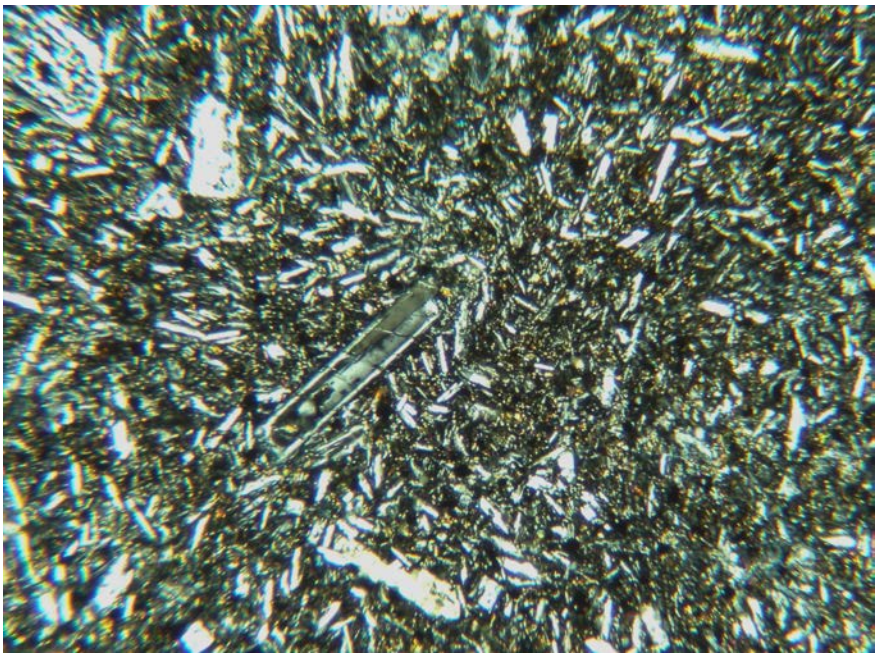
S7L



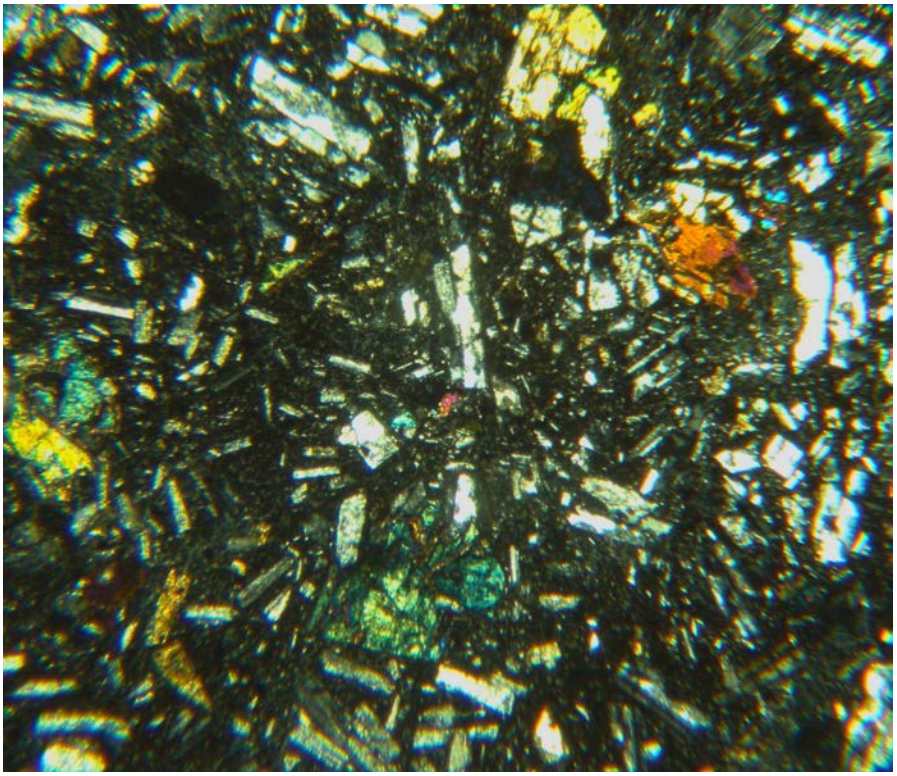
S7M-1



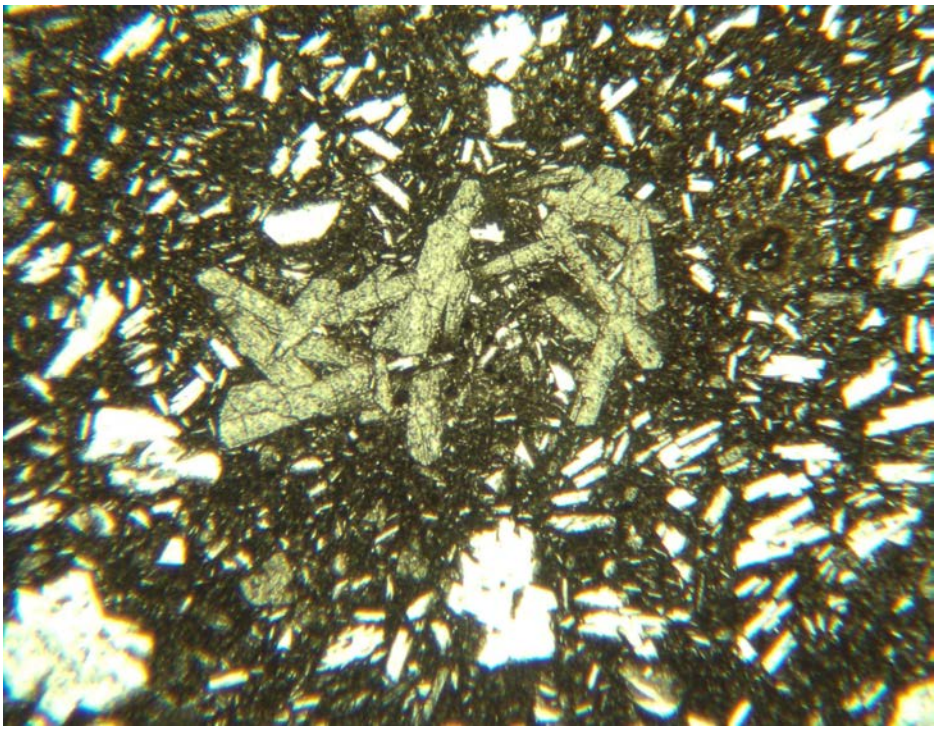
S7M-2



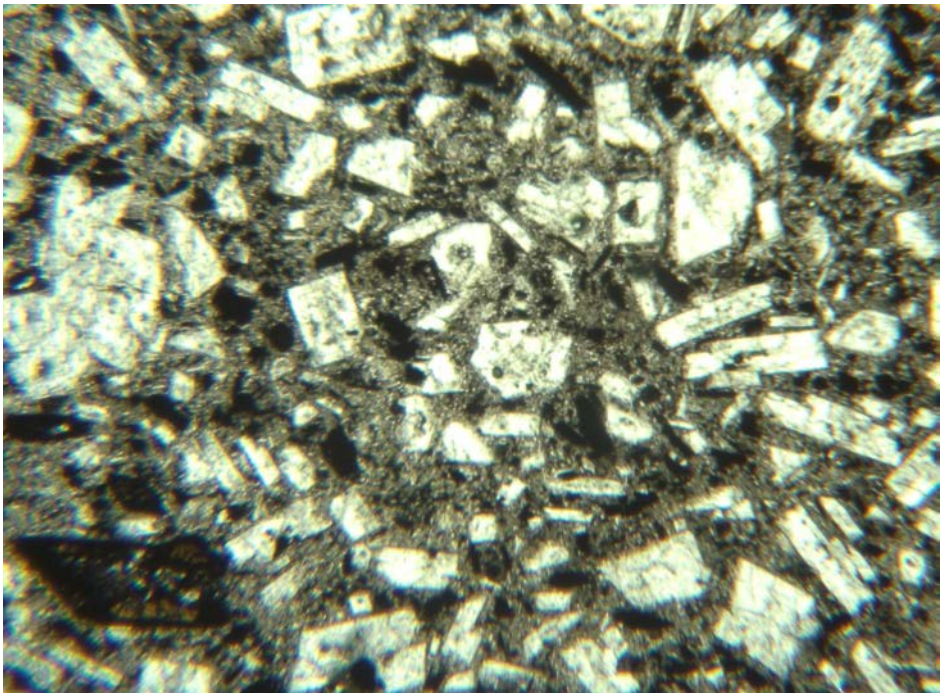
S7N



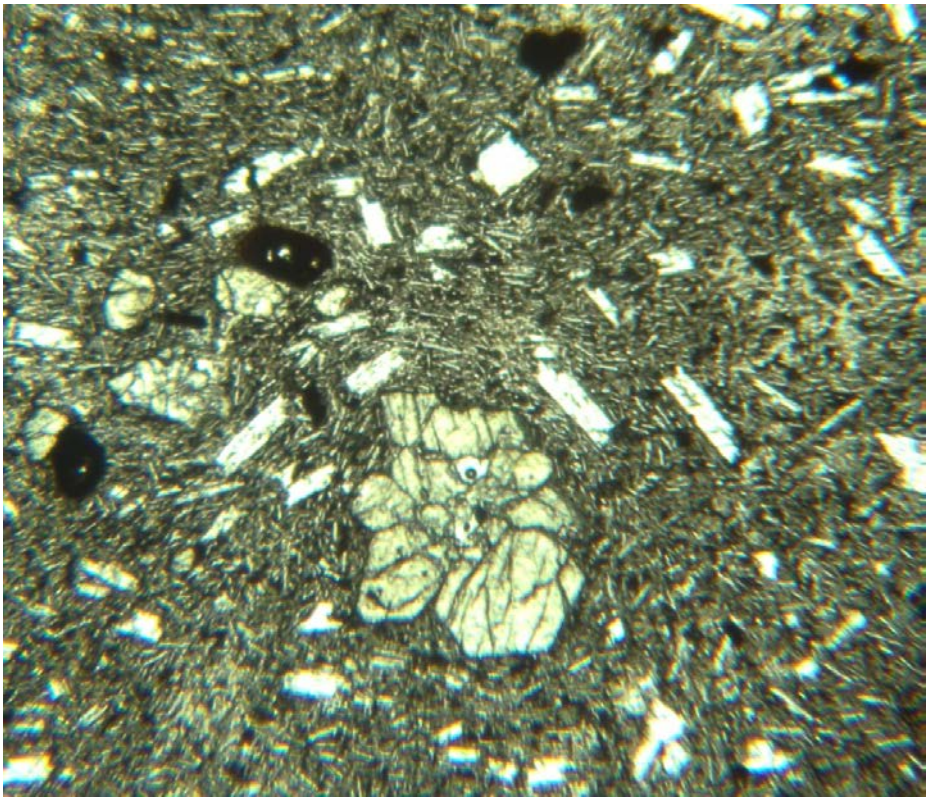
S7O



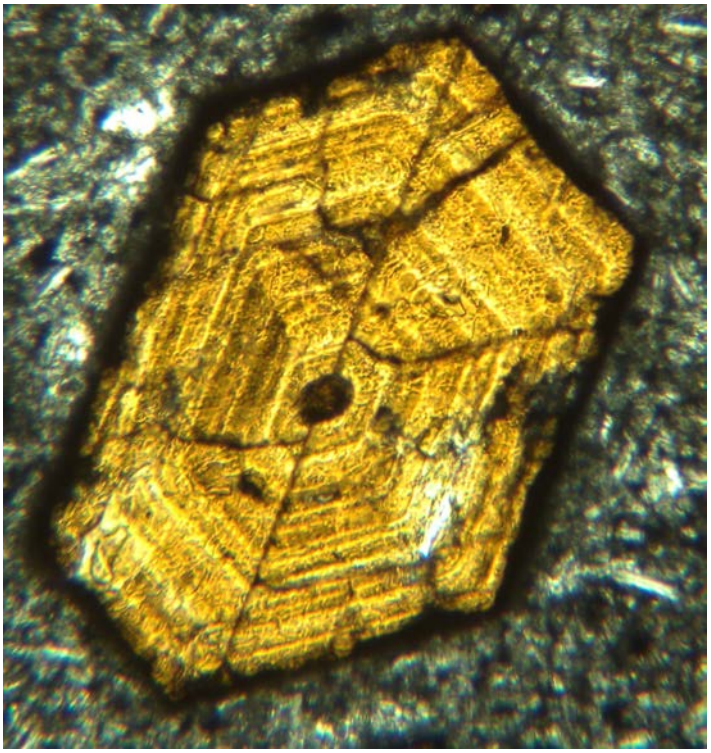
S7P



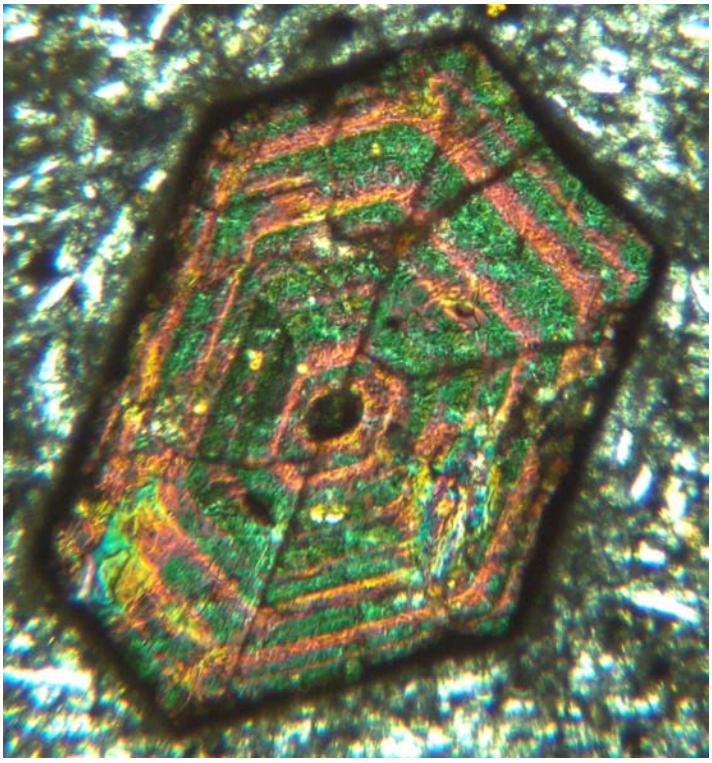
S7Q



S7R



S7S-1



S7S-2