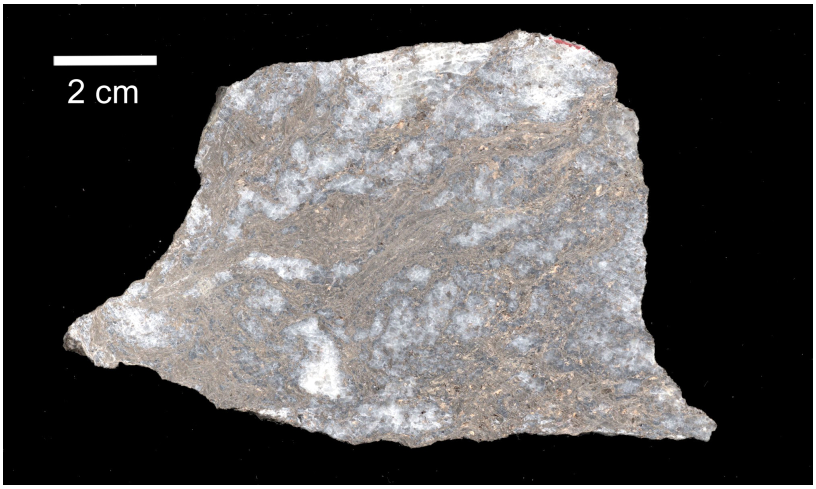

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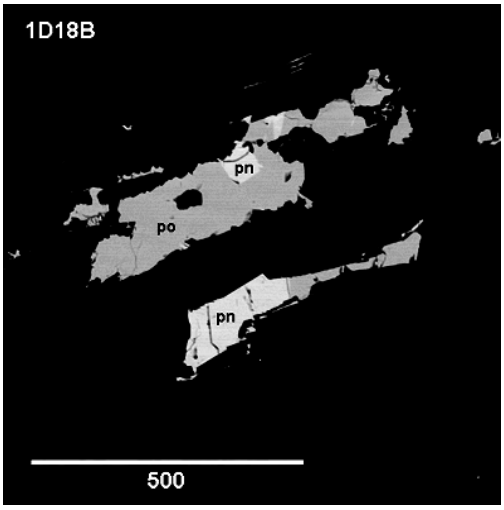

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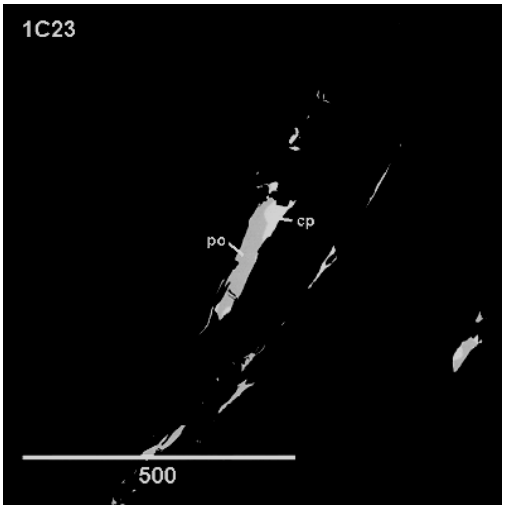
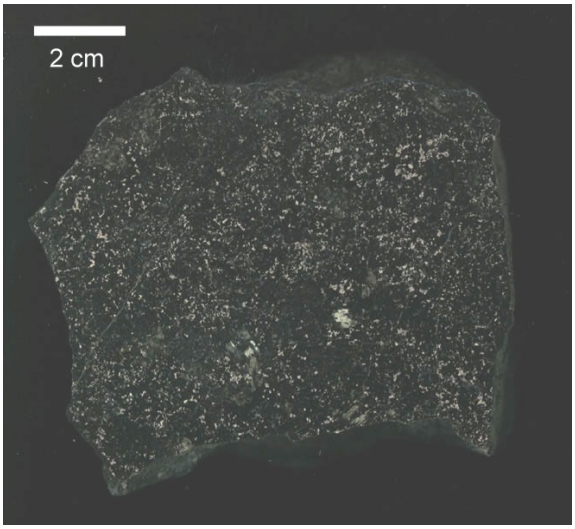


c

Figure 9.1 Textures representing disseminated sulfides in metasedimentary rocks. a) Mineralized biotite schist from the Thompson 1D ore body. b) BSE (backscatter electron) image of disseminated sulfides in a sillimanite-garnet-biotite schist from the Thompson 1D ore body, T3 Mine. pn = pentlandite, po = pyrrhotite, black background = silicates. Scale bar in μm. c) BSE image of disseminated sulfides in garnet-biotite schist from the 1C ore body, T3 mine. cp = chalcopyrite, po = pyrrhotite, black background = silicates. Scale bar in μm. From Liwanag (2001).



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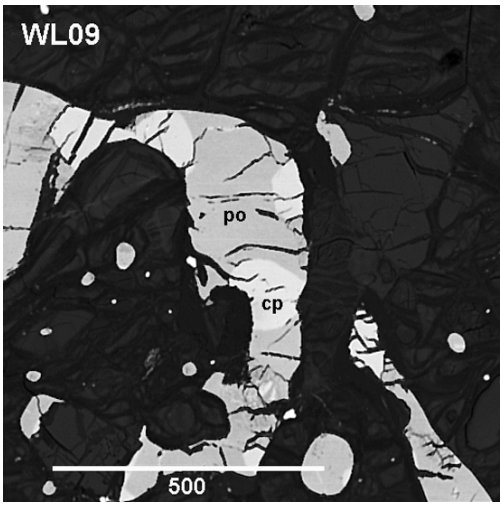

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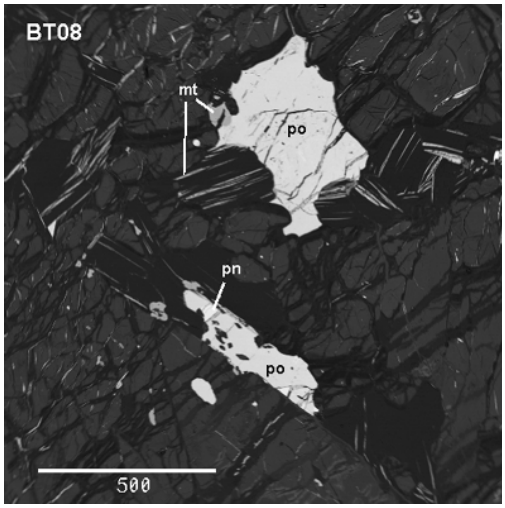
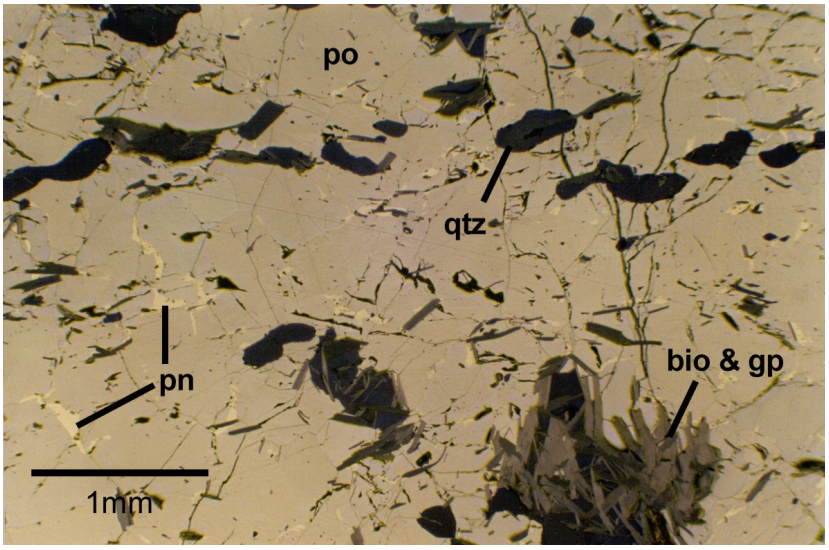


c

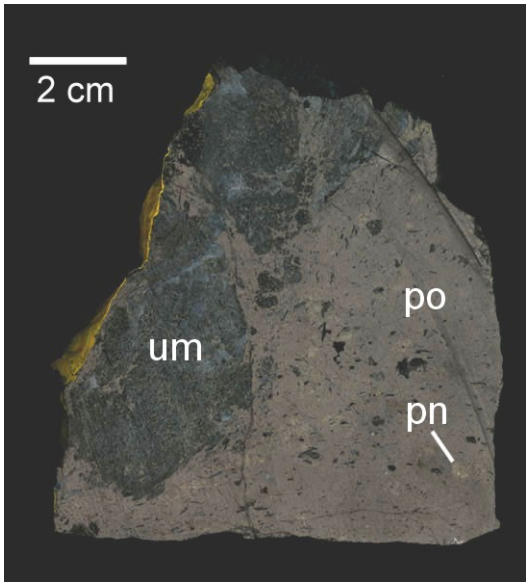
Figure 9.2. Textures representing disseminated sulfides in ultramafic rocks and interstitial sulfides in ultramafic rocks. a) Serpentinized peridotite containing interstitial sulfides from Birchtree Mine. b) BSE image of disseminated sulfides in serpentinized peridotite from the William Lake deposit. Note the blebby texture of the sulfides that are interstitial to serpentinized olivine (dark grey and black). cp = chalcopyrite, po = pyrrhotite. Scale bar in μm. c). BSE image of disseminated sulfides in serpentinized peridotite from the Birchtree mine. Magnetite (mt) occurs as fine along the edges of pyrrhotite (po), and also as lamellae in silicates (dark grey and black). Pentlandite (pn) occurs as fine angular patches in pyrrhotite. Scale bar in μm. From Liwanag (2001).

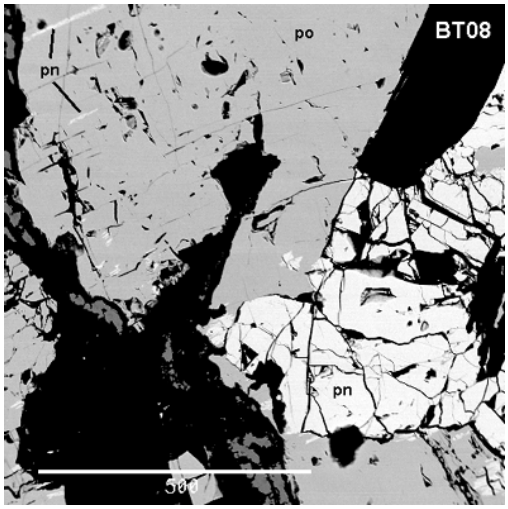
a



b

Figure 9.3 Textures representing barren sulfides in metasedimentary rocks. a) Sample from the Thompson T1 Mine, showing massive pyrrhotite with foliated single crystal inclusions of graphite and biotite, and ovoid aggregates of plagioclase, quartz, graphite, and biotite. b) Photomicrograph showing massive pyrrhotite (po) and flame-textured to fine chain-textured pentlandite (pn) with inclusions of graphite (gp), biotite (bio), and quartz (qtz). From Liwanag (2001).





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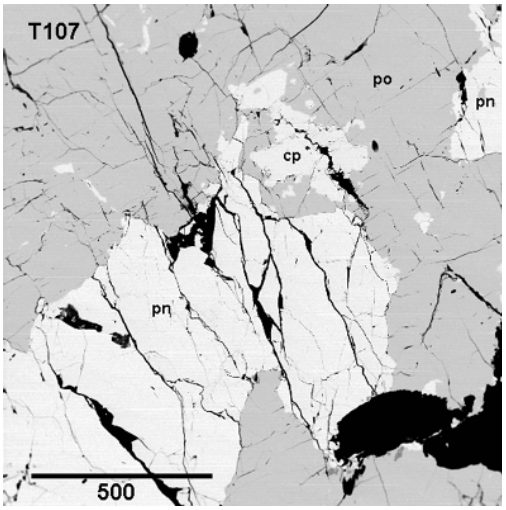
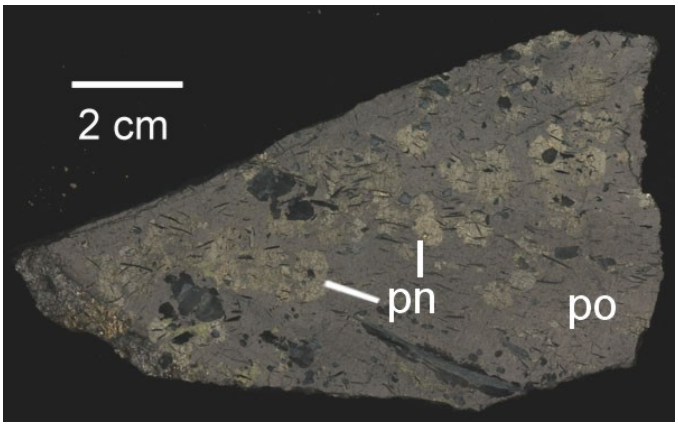
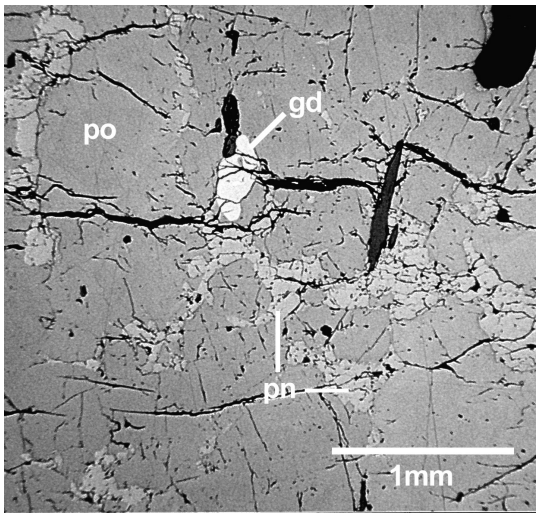


c

Figure 9.4 Textures representing massive sulfides in ultramafic breccias. a) Massive sulfide breccia sample from Birchtree Mine, showing cm-scale inclusions of serpentinite (um) and single crystal inclusions of mafic mica grains, quartz, and feldspar in massive pyrrhotite (po). Pentlandite (pn) occurs as medium-grained light-coloured "eyes". b) BSE image of sulfides hosted in a serpentinized peridotitic breccia from the Birchtree mine. Pentlandite (pn) occurs as lamellae and subrounded to subangular "eyes" in massive pyrrhotite (po). black areas = silicates and pits. Scale bar in μm. c) BSE image showing massive breccia sulfides from the T1 mine. cp = chalcopyrite, pn = pentlandite, po = pyrrhotite, black areas = silicates and pits. Scale bar in μm. From Liwanag (2001).



a



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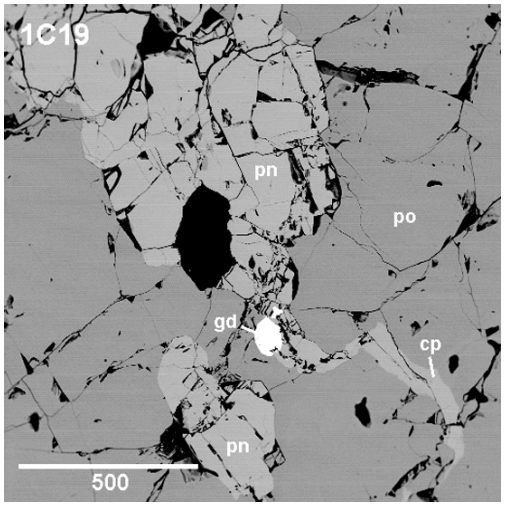


c

Figure 9.5 Textures representing massive and semi-massive sulfides in metasedimentary rocks. a) Massive sulfide sample from the Thompson T1 Mine, showing coarse grained annealed pyrrhotite and lighter-coloured pentlandite eyes. Inclusions are foliated mafic mica and aggregates of biotite, quartz, and plagioclase. b) Photomicrograph showing fractured massive sulfides hosted in biotite schist from the Birchtree Mine. Pentlandite (pn) occurs as "chains" at the boundaries of annealed pyrrhotite (po). The bright ovoid mineral in the centre of the figure is gersdorffite (gd). c) BSE image of semi-massive sulfides hosted in sillimanite-garnet-biotite gneiss from the 1C ore body, Thompson mine. Note the subrounded gersdorffite grain (gd) that has crystallized over pentlandite (pn). Chalcopyrite (cp) and pentlandite have the same grey levels in backscatter electron images; the typically fractured texture of pentlandite distinguishes it from chalcopyrite. po = pyrrhotite, black = silicates. Scale bar in μm. From Liwanag (2001).

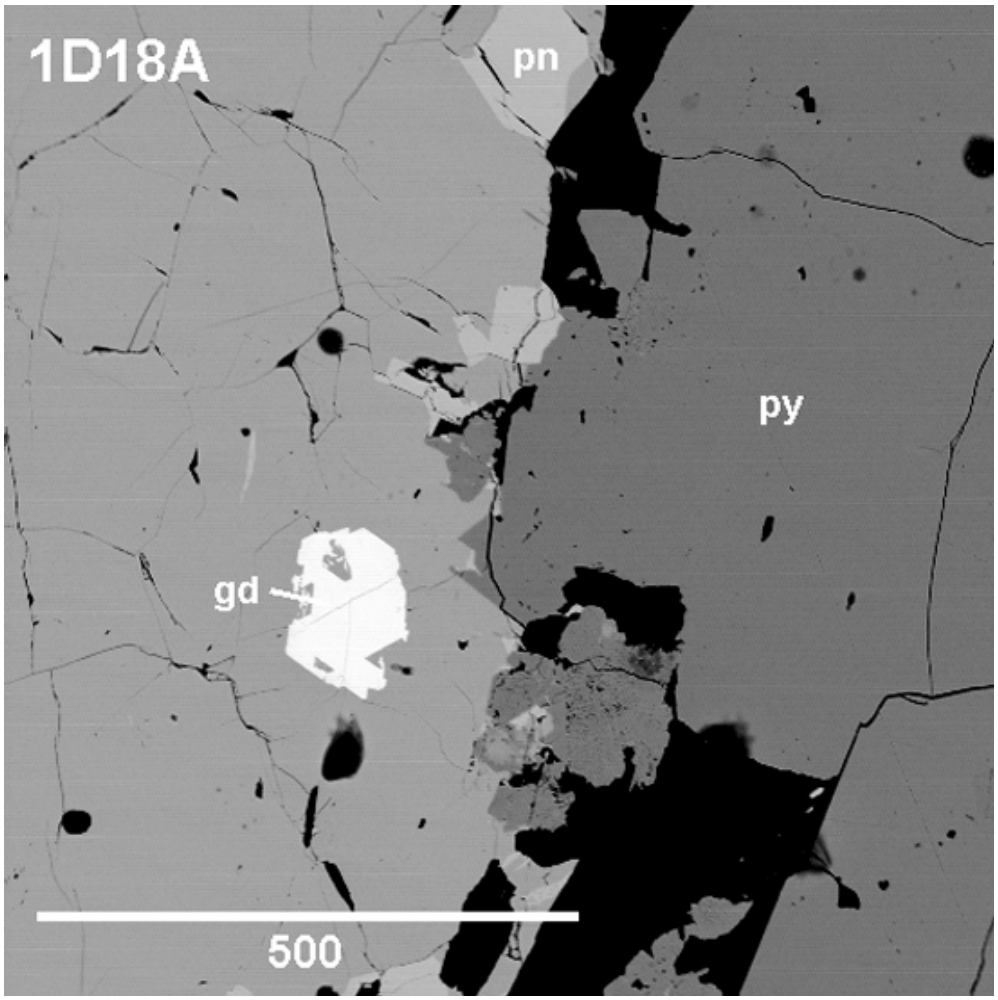


Figure 9.6 BSE image showing semi-massive sulfides hosted in biotite gneiss from the 1D ore body, Thompson mine. Note the subhedral gersdorffite grain (gd) within massive pyrrhotite. Pyrite (py) occurs as aggregates of subhedral replacing pyrrhotite. pn = pentlandite, black = silicates. Scale bar in μm. From Liwanag (2001).

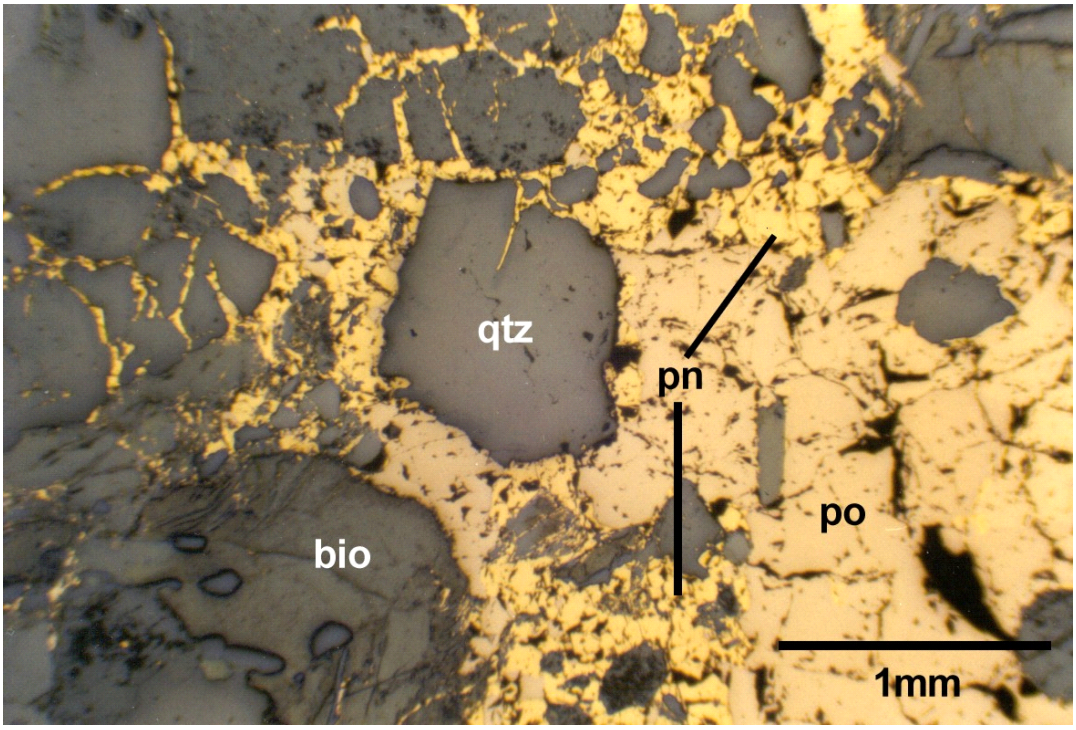


Figure 9.7 Brecciated silicate fragments along contact between garnet biotite schist and massive sulfides. Sample is from the Thompson 1C ore body. From Liwanag (2001).

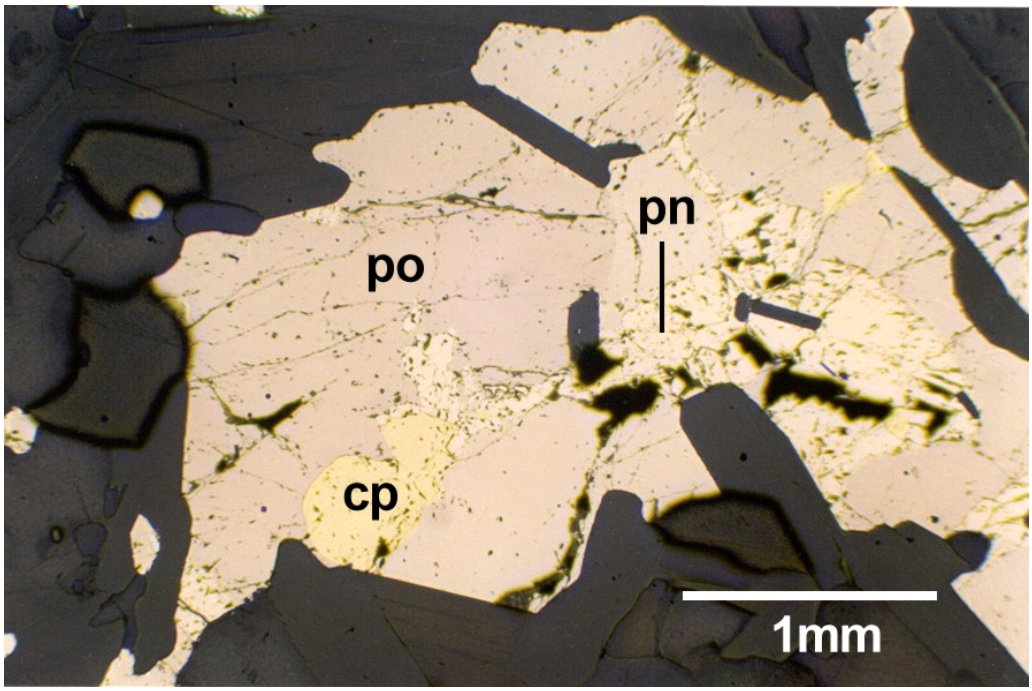


Figure 9.8 Stringer sulfides in garnet biotite gneiss from the Thompson T1 Mine. Chalcopyrite tends to be concentrated in such stringers throughout the Thompson Mine. From Liwanag (2001).

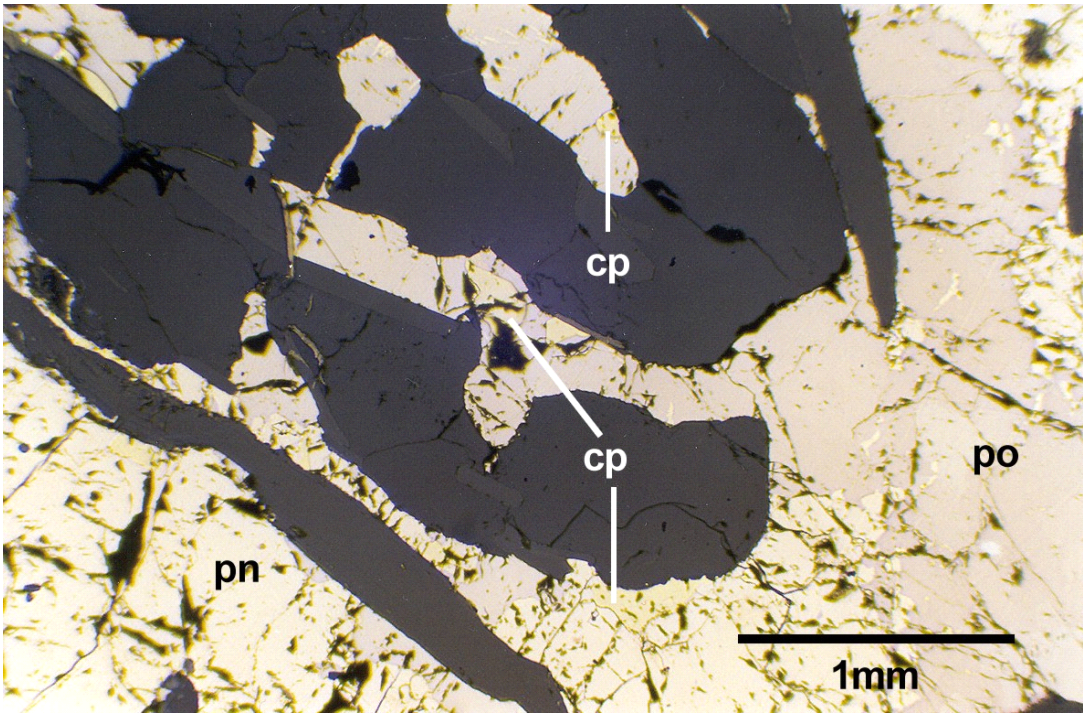
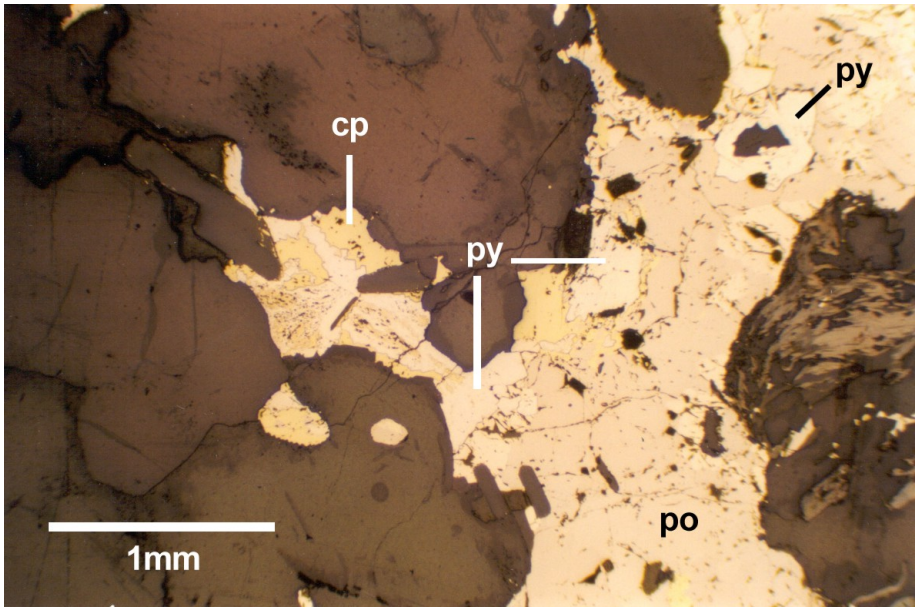


Figure 9.9 Example of chalcopyrite occurring adjacent to porphyroblastic silicates in massive sulfides. Silicates are embayed aggregates of quartz and feldspar oriented parallel to foliated biotite porphyroblasts. Sample is from the Thompson T1 Mine. From Liwanag (2001).



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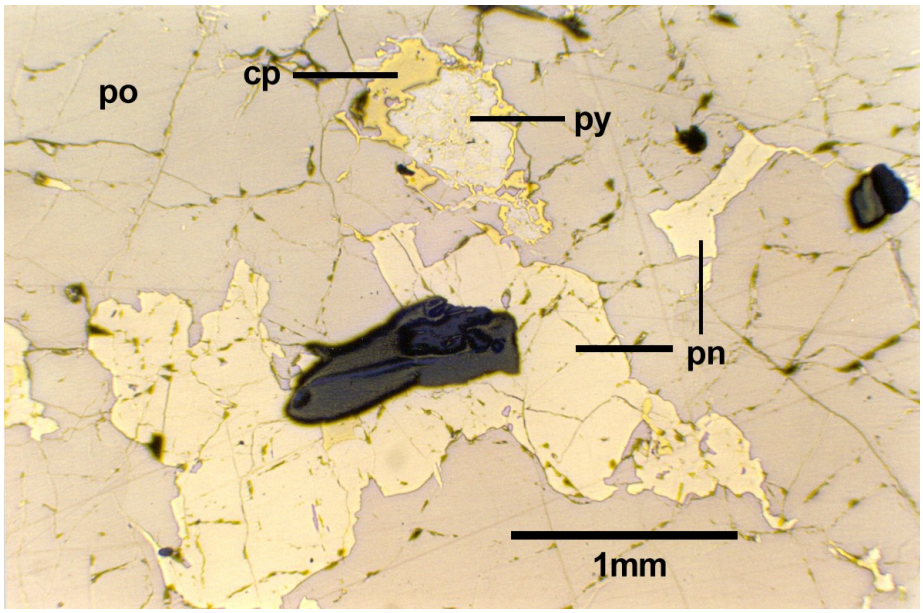
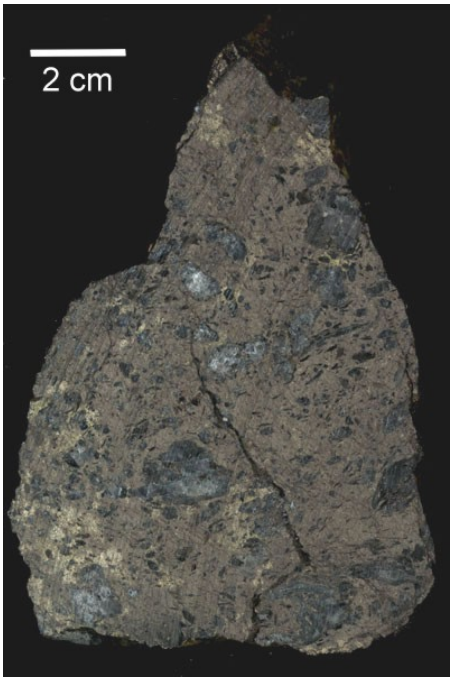


b

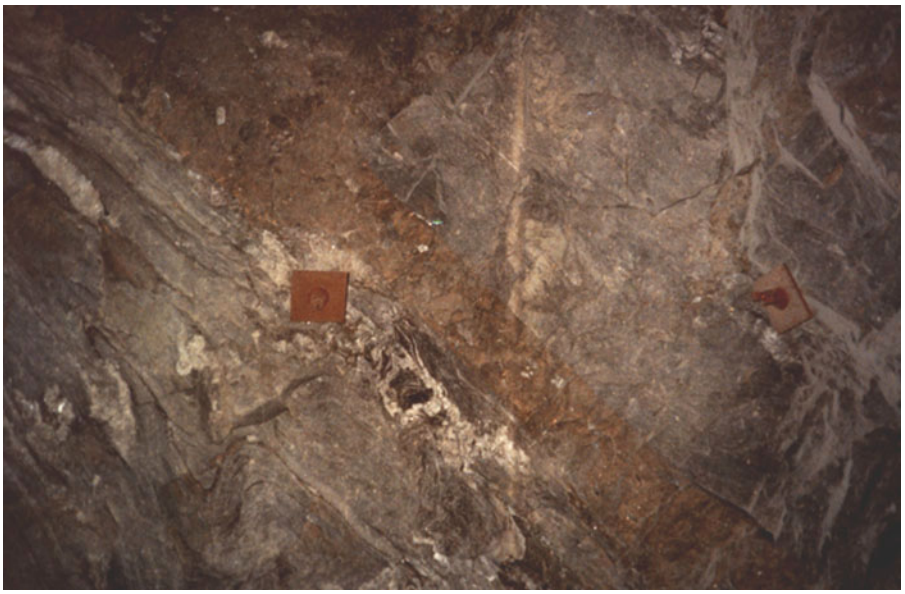
Figure 9.10 Pyrite-chalcopyrite symplectites. a) Symplectite in stringer sulfides from the Thompson 1D ore body. b) Symplectite in annealed massive sulfides from the Thompson T1 Mine. From Liwanag (2001).

a



b

Figure 9.11 Massive sulfides from the Thompson T1 Mine. a) Massive sulfides in the matrix of serpentinized ultramafic breccia. Ultramafic boudins have talc-carbonate envelopes. Field of view is 12 feet (3.7m). b) Massive sulfides consisting of medium to coarse grained annealed pyrrhotite and pentlandite, and inclusions of pelitic schist fragments and serpentinized peridotite. From Liwanag (2001).



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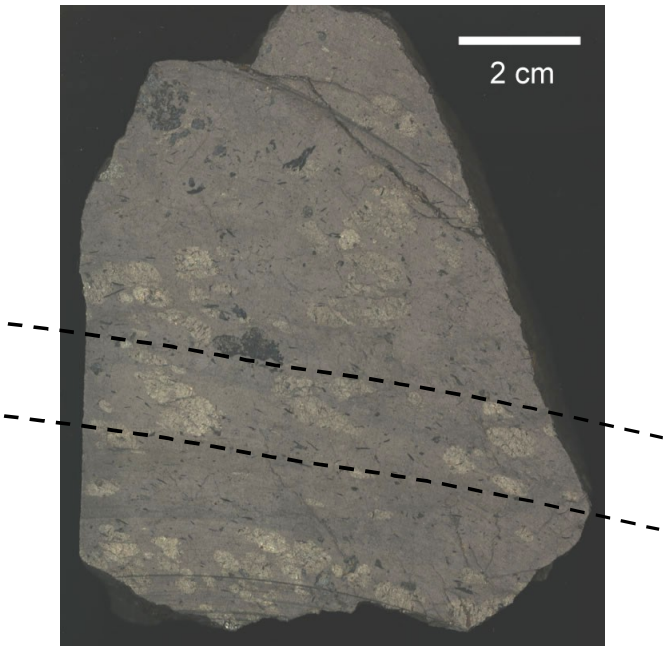
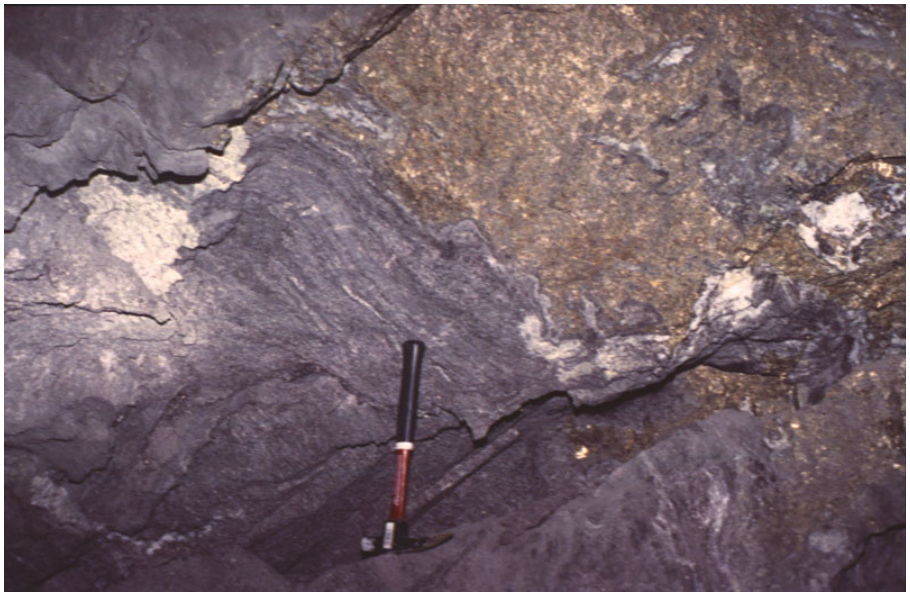


b

Figure 9.12 Massive sulfides from the Thompson 1C ore body. a) Concordant massive sulfides hosted in biotite schist. Field of view is 7.5 feet (2.3m). (b) Massive sulfides consisting of coarse pyrrhotite and pentlandite eyes oriented parallel to foliated mica inclusions and schistose aggregates. From Liwanag (2001).



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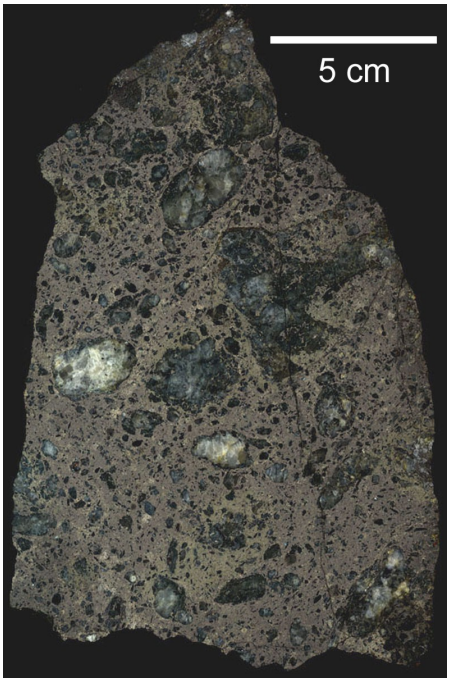

b

Figure 9.13 Semi-massive sulfides from the Thompson 1D ore body. a) Semi-massive sulfides at the contact with biotite schist. Schist and sulfides contain decimetre-scale pegmatitic sweats. b) Semi-massive sulfide sample containing fine to medium grained pyrrhotite, pentlandite, and chalcopyrite, and coarse ovoid inclusions of pegmatitic granite. From Liwanag (2001).

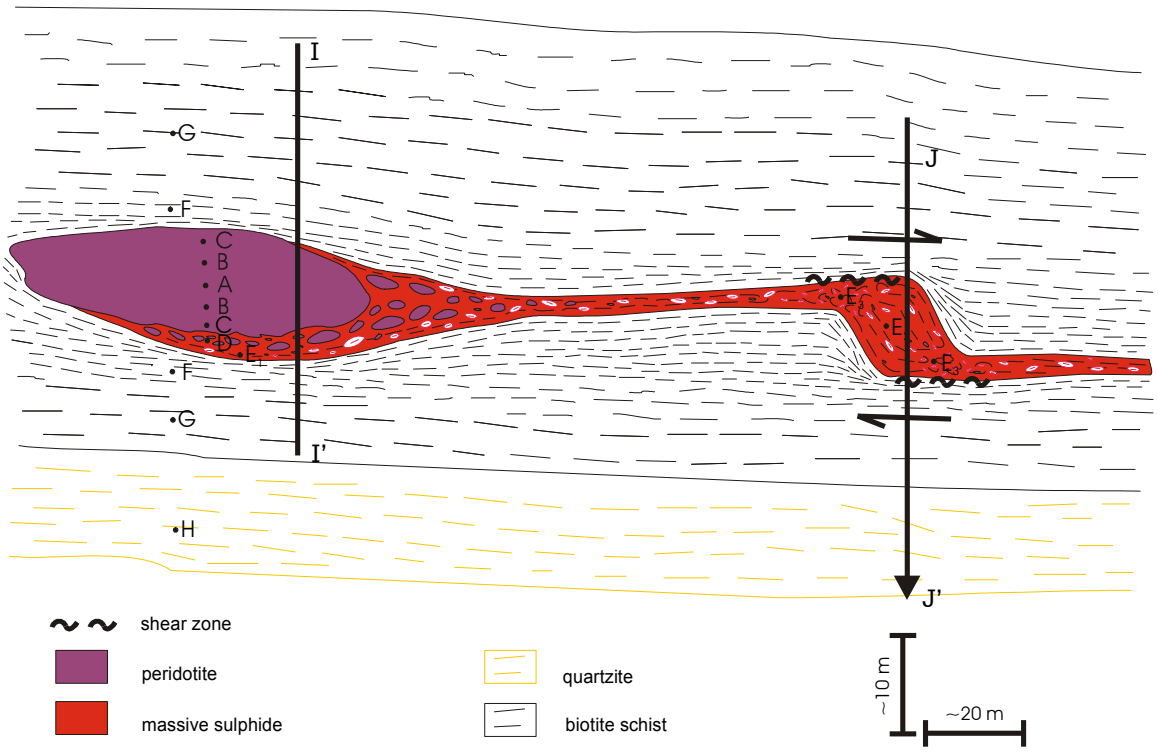

Figure 9.14 Schematic diagram of an ore zone in the 1C ore body, Thompson Mine. Letters A to H refer to relative locations of representative sulfide textures in the mine. Photomicrographs of these textures are shown in **Figure 9.15**. Section I-I' and J-J' are traverses along which sulfide-bearing samples were collected for electron microprobe analyses (**Figs. 9.20** and **9.21**). From Liwanag (2001).

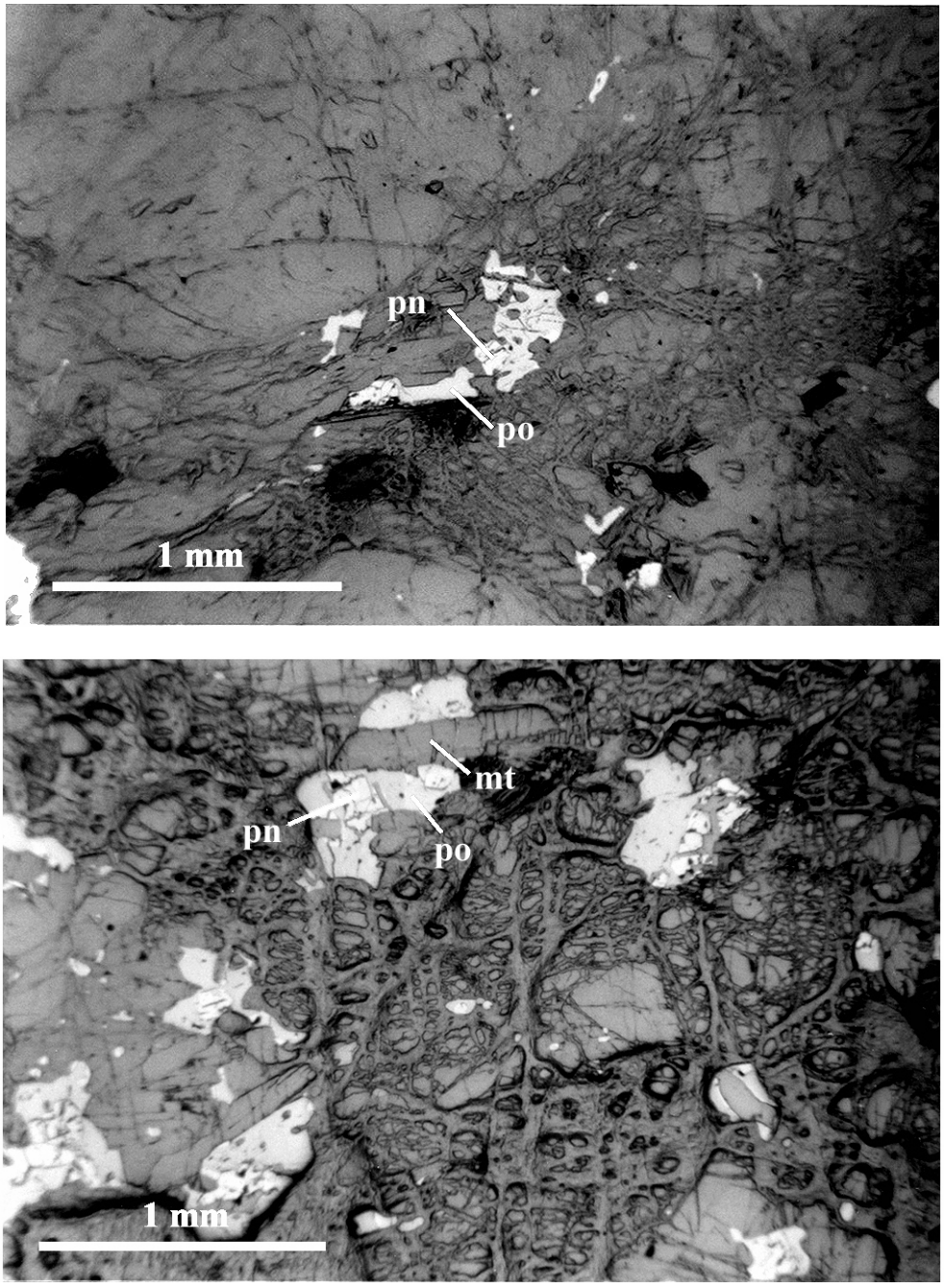

Figure 9.15 Reflected light photomicrographs of typical sulfide-bearing samples from a nickel ore zone in the 1C ore body, Thompson Mine. Letter symbols in the left-hand corner of all photomicrographs correspond to sample locations in **Figure 9.14**. Abbreviations: po=pyrrhotite, pn=pentlandite, py=pyrite, mt=magnetite. Darkest phases in photomicrographs are silicates. (A) Disseminated sulfides in interior of ultramafic sill. Major silicate phase is pyroxene. Fibrous silicate phase is serpentine. (B) Disseminated sulfides toward exterior of ultramafic sill, where serpentinization is more pervasive. From Liwanag (2001).