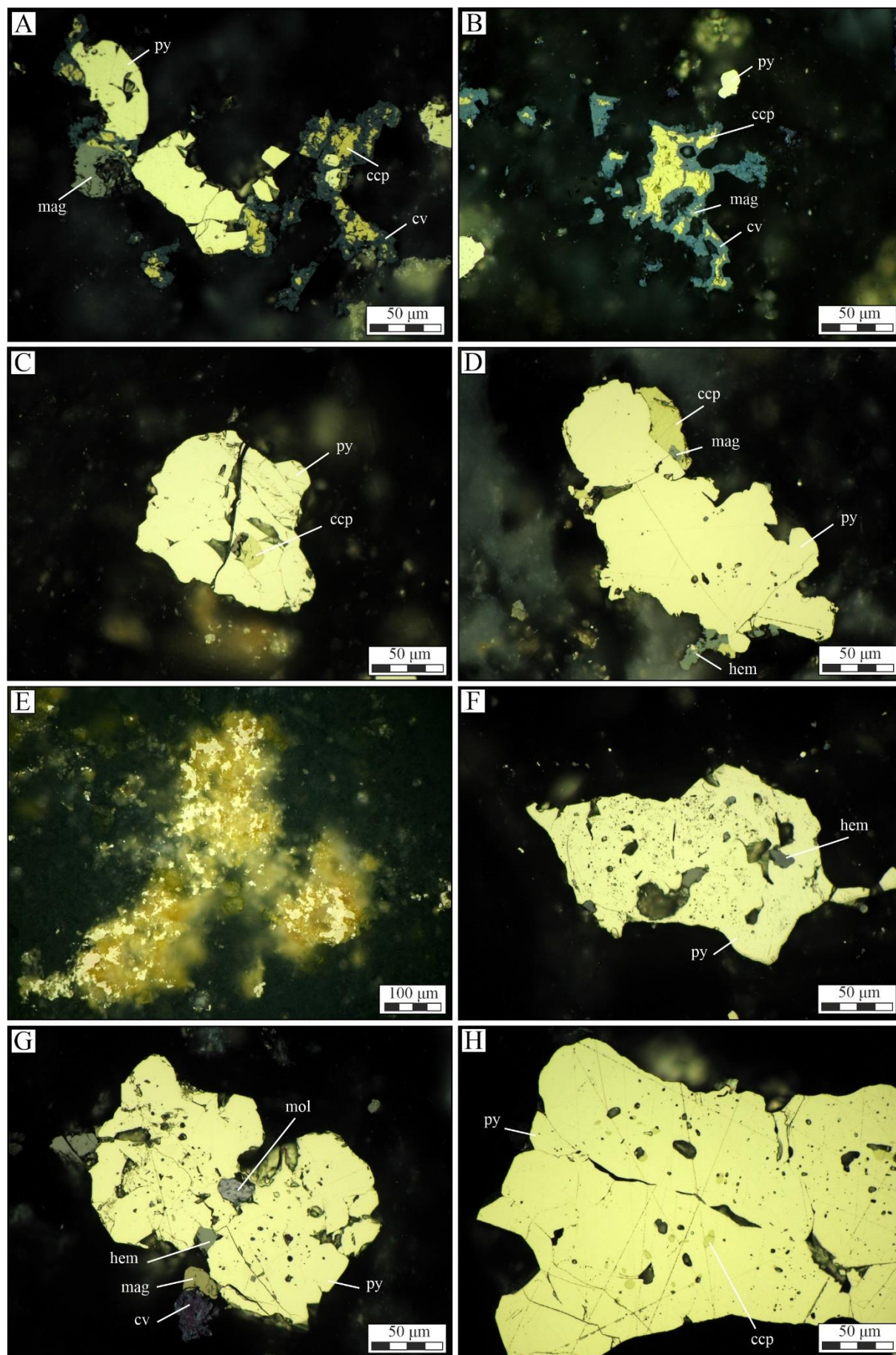
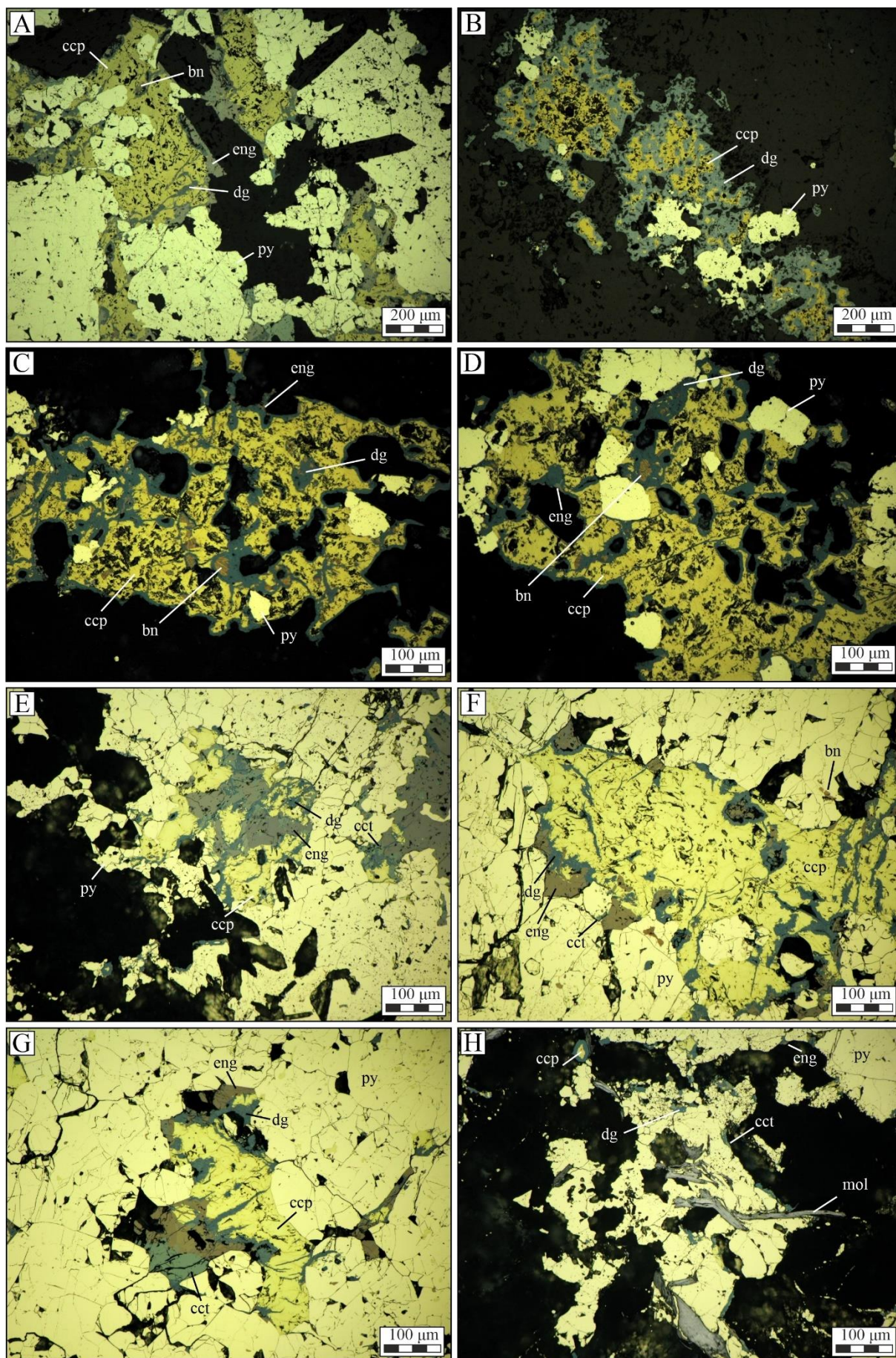
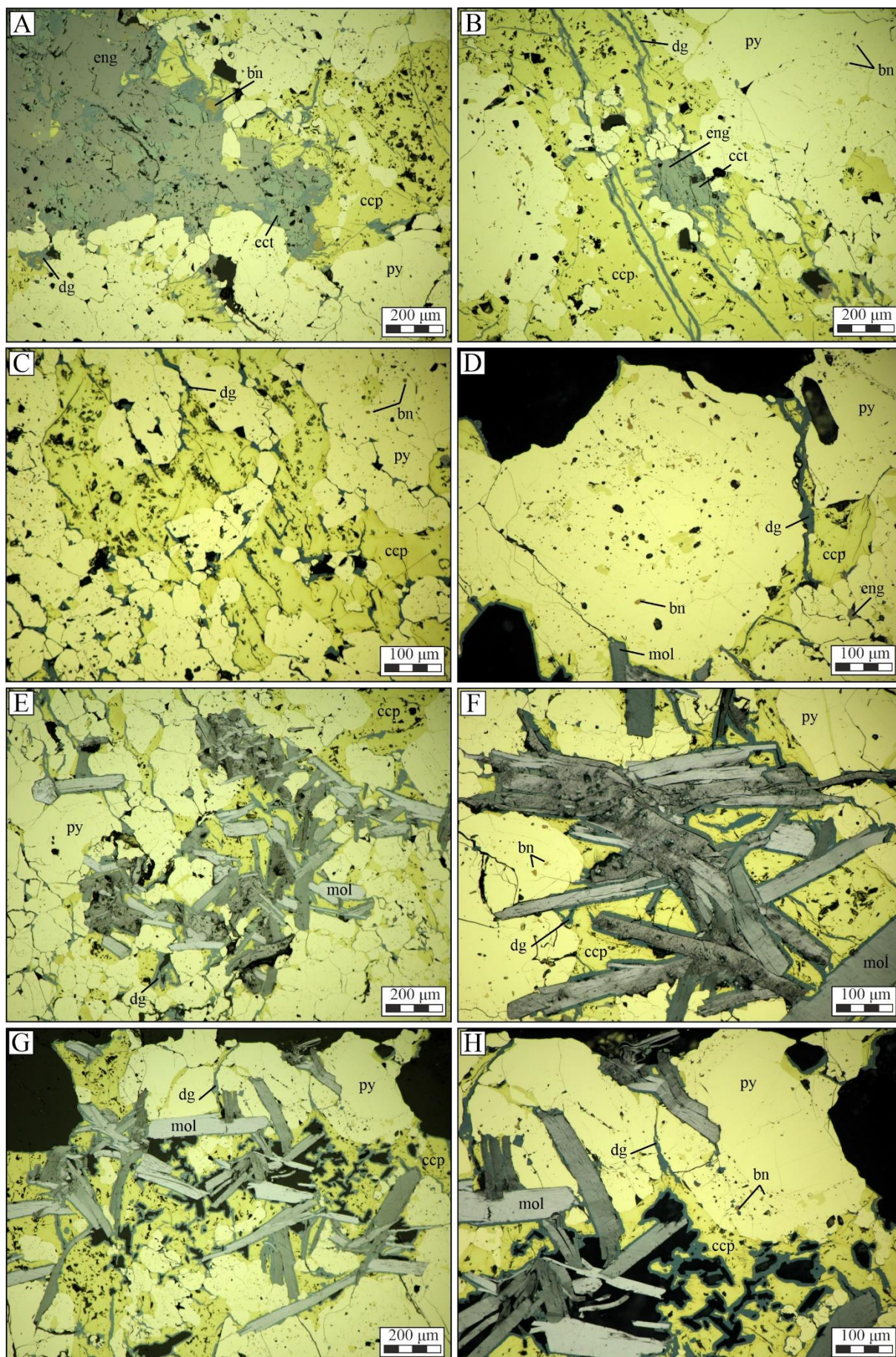




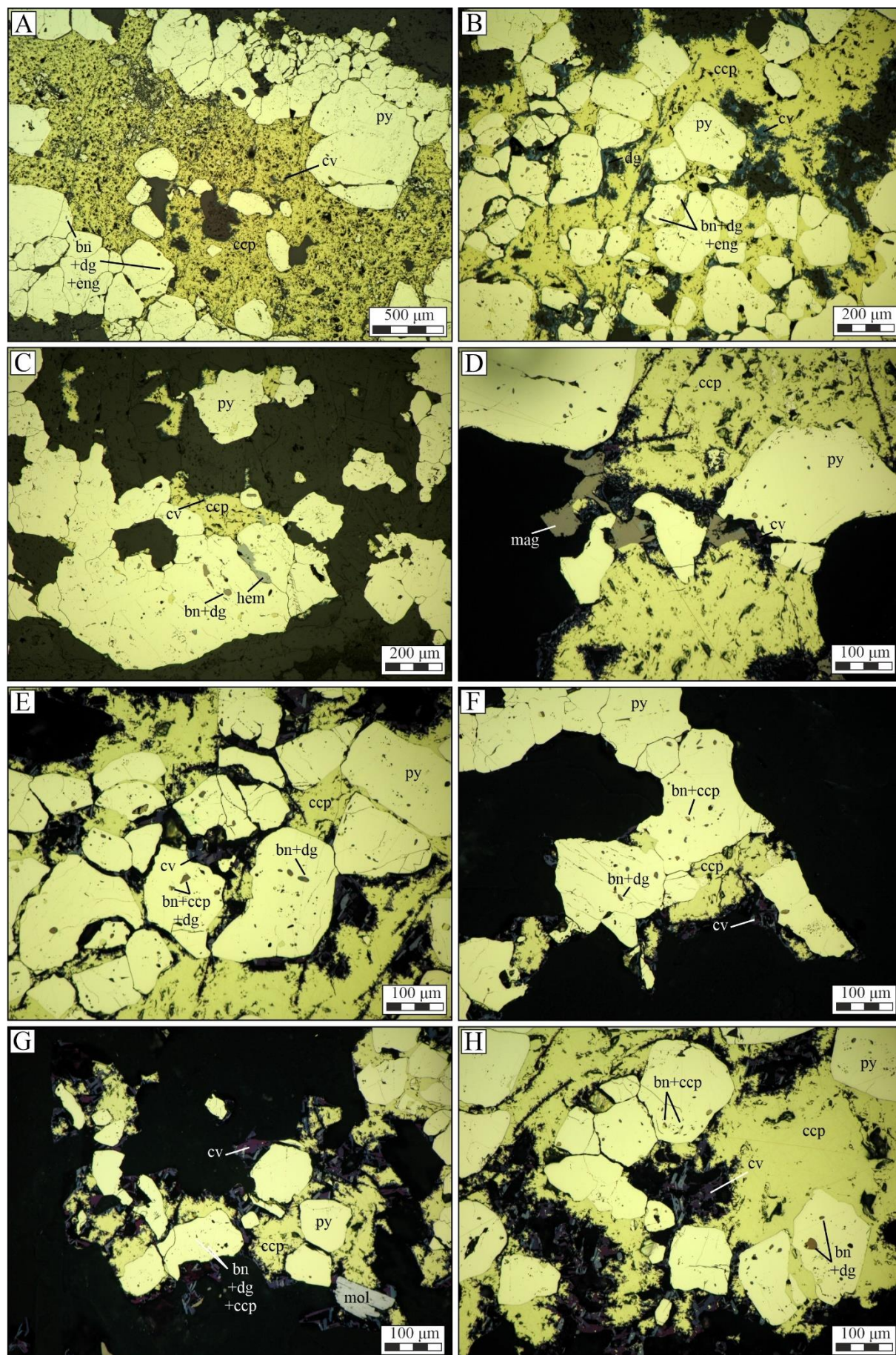
**Fig. A2-1.** **A:** Pyrite and magnetite overgrown by chalcopyrite. Chalcopyrite is partly replaced by covellite. **B:** Early pyrite and magnetite with later chalcopyrite. Chalcopyrite is partly replaced by covellite. **C:** Chalcopyrite enclosed in pyrite. **D:** Pyrite and magnetite overgrown by chalcopyrite. Magnetite contains tiny hematite crystals. **E:** Magnetite pervasively altered to different Fe (hydro)oxides. **F:** Hematite enclosed in pyrite. **G:** Hematite and molybdenite overgrown by pyrite. Magnetite occurs along the pyrite rims. Chalcopyrite is completely replaced by covellite. **H:** Chalcopyrite enclosed in pyrite. **A, B:** VALDD12-10\_85. **C:** VALDD12-10\_107. **D:** VALDD12-10\_120. **E:** VALDD13-14\_16. **F:** VALDD13-14\_67. **G, H:** VALDD13-14\_340. **A-H:** All photomicrographs are taken in oil. Abbreviations: ccp = chalcopyrite; cv = covellite; hem = hematite; mag = magnetite; mol = molybdenite; py = pyrite.



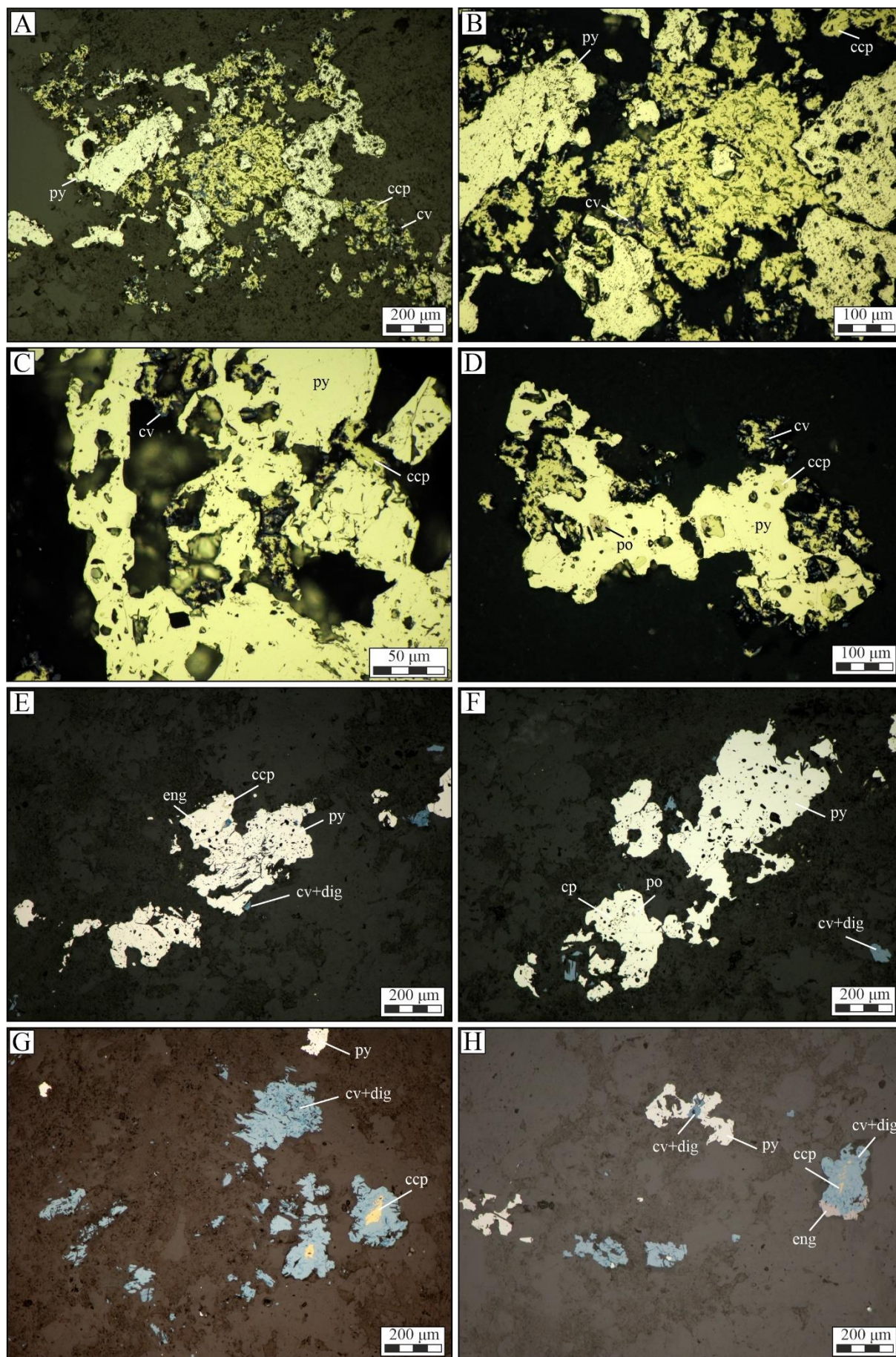
**Fig. A2-2.** **A:** Pyrite overgrown by chalcopyrite-digenite-enargite. Chalcopyrite has enclosed tiny bornite crystals, which show exsolution laminae of chalcopyrite. **B:** Pyrite overgrown by chalcopyrite-digenite. **C:** Pyrite and bornite overgrown by chalcopyrite-digenite-enargite. Bornite shows exsolution laminae of chalcopyrite. **D:** Pyrite and bornite overgrown by chalcopyrite-digenite-enargite. Bornite shows exsolution laminae of chalcopyrite. **E:** Chalcocite-chalcopyrite-digenite-enargite enclosed in pyrite. **F:** Bornite and chalcocite-chalcopyrite-digenite-enargite enclosed in pyrite. **G:** Chalcocite-chalcopyrite-digenite-enargite enclosed in pyrite. **H:** Chalcocite-chalcopyrite-digenite-enargite and molybdenite flakes enclosed in pyrite. **A-H:** VALDD13-14\_ 380. All photomicrographs are taken in oil. Abbreviations: bn = bornite; cct = chalcocite; ccp = chalcopyrite; dg = digenite; eng = enargite; mol = molybdenite; py = pyrite.



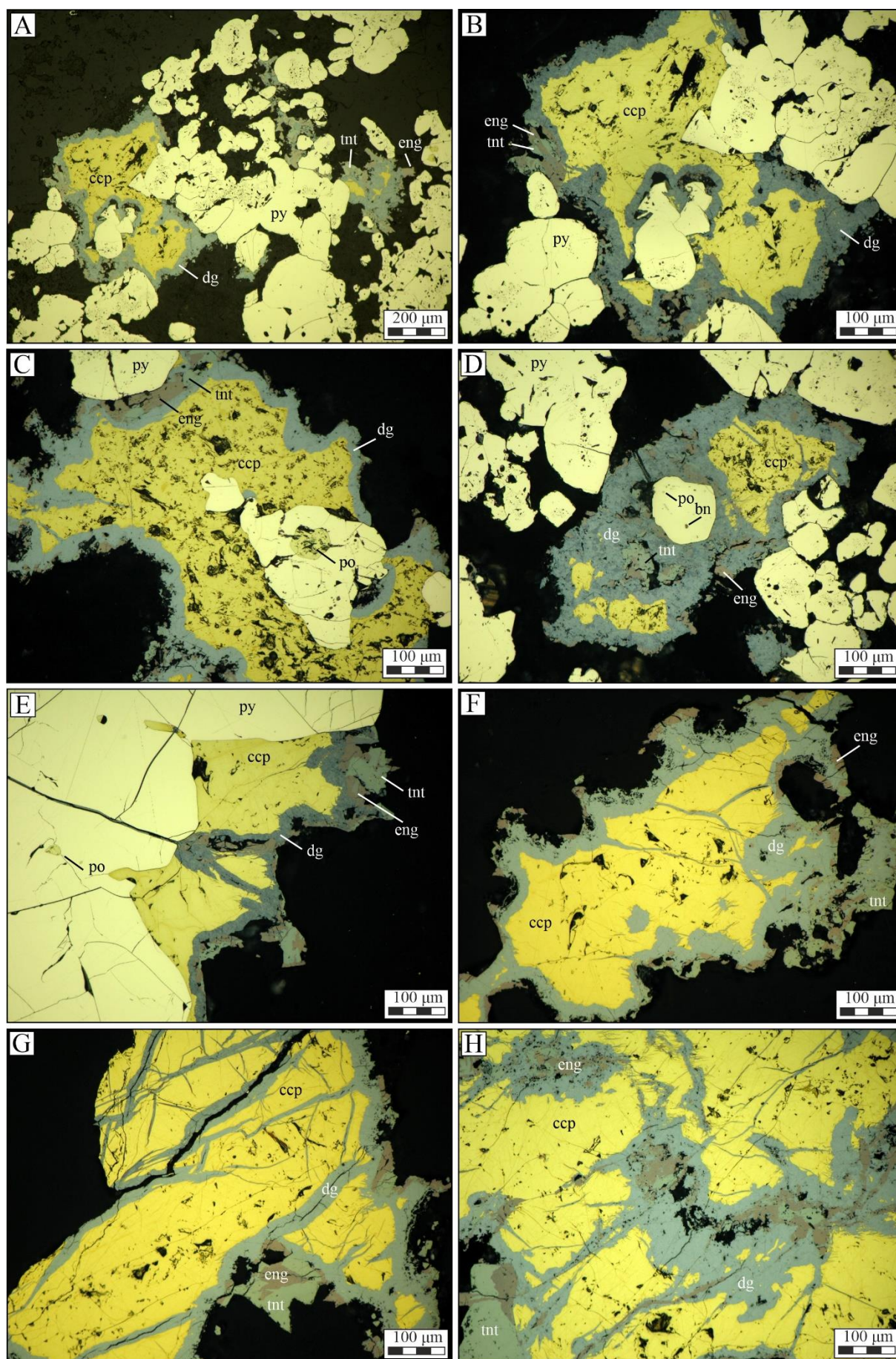
**Fig. A2-3.** **A:** Bornite-chalcocite-chalcopyrite-digenite-enargite in pyrite. **B:** Chalcocite-digenite-enargite and tiny bornite crystals in pyrite. **C:** Chalcopyrite-digenite and tiny bornite crystals in pyrite. **D:** Chalcopyrite-digenite-enargite, molybdenite flakes and tiny bornite crystals in pyrite. **E:** Molybdenite overgrown by chalcopyrite-digenite in pyrite. **F:** Molybdenite flakes overgrown by chalcopyrite-digenite in pyrite. Tiny bornite crystals occur separately in pyrite. **G:** Molybdenite flakes overgrown by chalcopyrite-digenite in pyrite. **H:** Molybdenite flakes overgrown by bornite-chalcopyrite-digenite in pyrite. **A-H:** VALDD13-14\_381. All photomicrographs are taken in oil. Abbreviations: bn = bornite; cct = chalcocite; ccp = chalcopyrite; dg = digenite; eng = enargite; mol = molybdenite; py = pyrite.



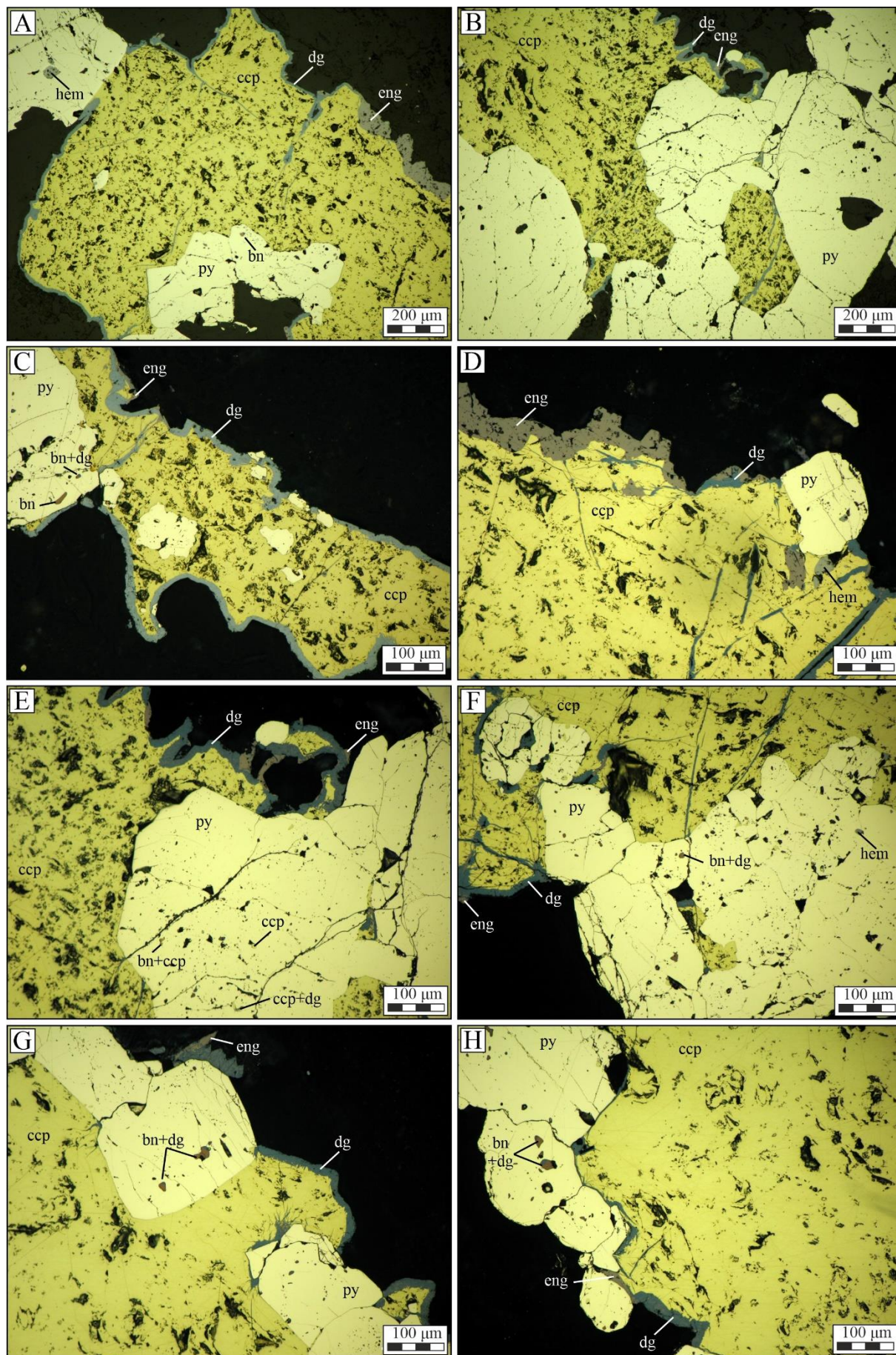
**Fig. A2-4. A:** Pyrite overgrown by chalcopyrite. Chalcopyrite shows an incipient replacement by covellite. Tiny inclusions in pyrite are bornite-digenite-enargite. **B:** Pyrite overgrown by chalcopyrite-digenite. Chalcopyrite shows an incipient replacement by covellite. Tiny inclusions in pyrite are bornite-digenite-enargite. **C:** Hematite enclosed by pyrite. Pyrite is overgrown by chalcopyrite. Chalcopyrite shows an incipient replacement by covellite. In addition, pyrite has enclosed small crystals of bornite-digenite. **D:** Pyrite overgrown by chalcopyrite which shows an incipient replacement by covellite. Magnetite shows an incipient replacement by hematite (martitization). **E:** Pyrite overgrown by chalcopyrite. Chalcopyrite shows an incipient replacement by covellite. Tiny inclusions in pyrite are bornite-digenite-chalcopyrite. Some bornite inclusions show lamellae of chalcopyrite. **F:** Pyrite overgrown by chalcopyrite, which shows an incipient replacement by covellite. Tiny inclusions in pyrite are bornite-digenite-chalcopyrite. **G:** Pyrite and molybdenite overgrown by chalcopyrite, which shows an incipient replacement by covellite. Tiny inclusions in pyrite are bornite-digenite-chalcopyrite. **H:** Pyrite overgrown by chalcopyrite, which shows an incipient replacement by covellite. Pyrite contains bornite-digenite-chalcopyrite inclusions. **A-H:** VALDD13-14\_390. Photomicrographs **B-H** are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; cv = covellite; dg = digenite; eng = enargite; hem = hematite; mag = magnetite; mol = molybdenite; py = pyrite.



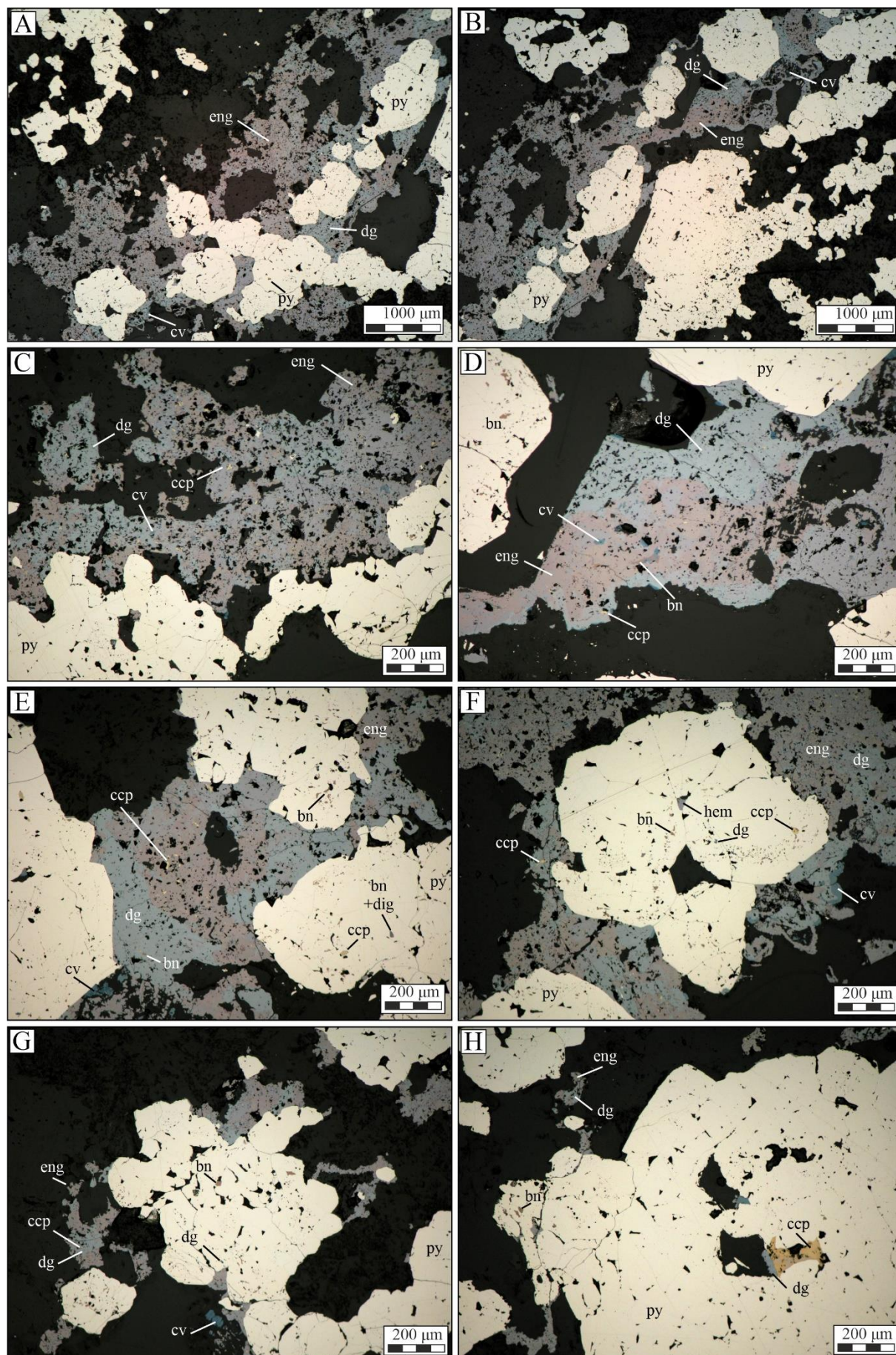
**Fig. A2-5.** **A:** Pyrite overgrown by chalcopyrite, which shows an incipient replacement by covellite. **B:** Pyrite overgrown by chalcopyrite, which shows an incipient replacement by covellite. **C:** Pyrite overgrown by chalcopyrite, which shows an incipient replacement by covellite. **D:** Pyrite overgrown by chalcopyrite. Inclusions in pyrite voids are chalcopyrite-pyrrhotite. **E:** Pyrite with digenite-chalcopyrite. Pyrite contains chalcopyrite-digenite and pyrrhotite inclusions. Chalcopyrite is partly replaced by covellite. **F:** Pyrite with digenite-covellite. Covellite results from replacement of chalcopyrite. Pyrite contains chalcopyrite and pyrrhotite inclusions. **G:** Pyrite with chalcopyrite-digenite, where chalcopyrite is largely replaced by covellite. **H:** Pyrite with digenite-covellite inclusions and separate chalcopyrite-digenite-enargite crystals. Chalcopyrite is largely replaced by covellite. **A-D:** VALDD13-14\_420. **E-H:** VALDD13-14\_437. **A-H:** All photomicrographs are taken in oil. Abbreviations: ccp = chalcopyrite; cv = covellite; dg = digenite; eng = enargite; py = pyrite; po = pyrrhotite.



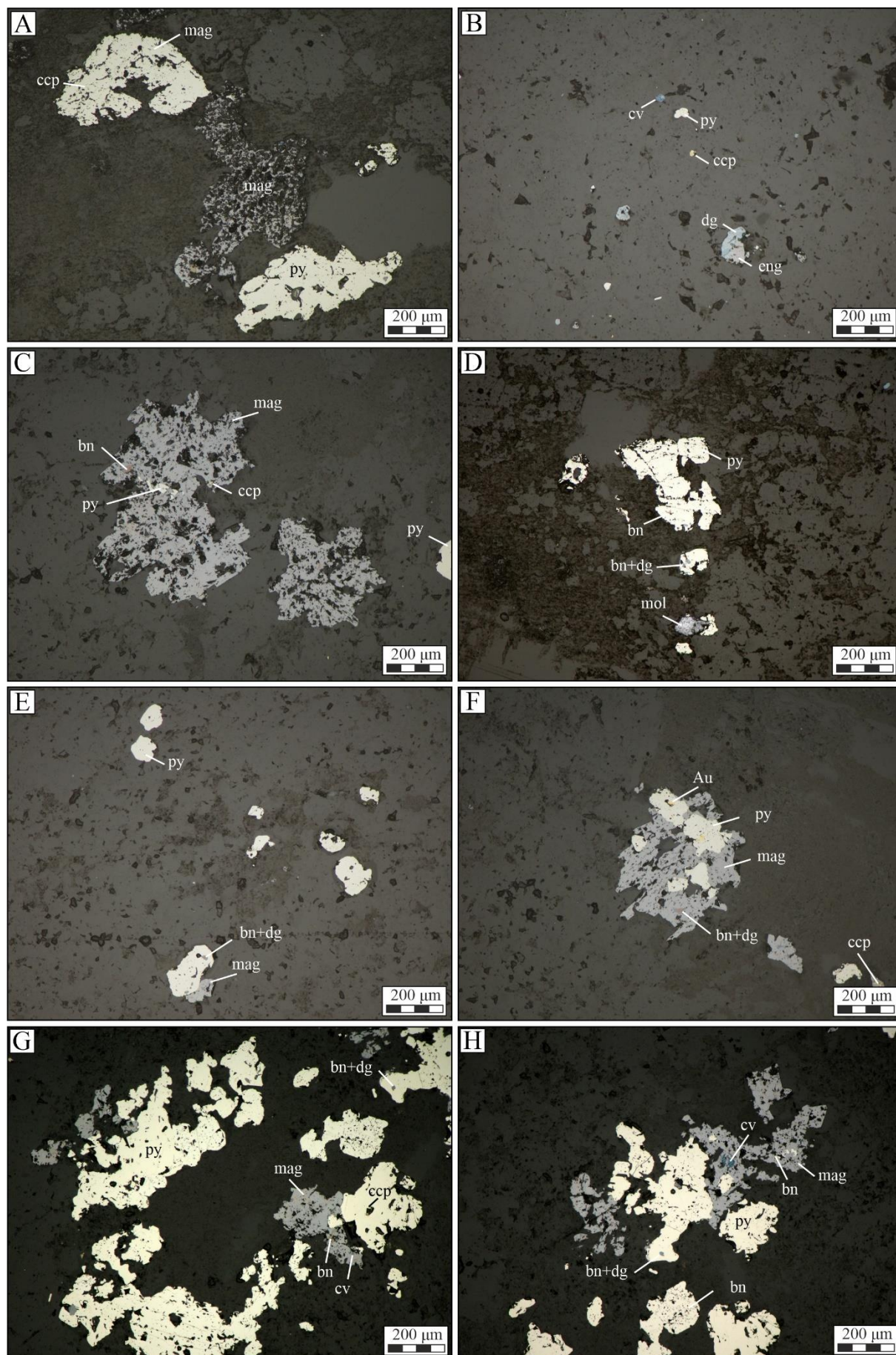
**Fig. A2-6.** **A:** Pyrite overgrown by chalcopyrite-digenite-enargite-tennantite. **B:** Pyrite overgrown by chalcopyrite-digenite-enargite-tennantite. **C:** Pyrite overgrown by chalcopyrite-digenite-enargite-tennantite. Pyrite has enclosed pyrrhotite. **D:** Pyrite overgrown by chalcopyrite-digenite-enargite-tennantite. Pyrite contains bornite and pyrrhotite inclusions. **E:** Pyrite overgrown by chalcopyrite-digenite-enargite-tennantite. Pyrite contains tiny pyrrhotite inclusions. **F:** Intergrowths of chalcopyrite-digenite-enargite-tennantite. **G:** Intergrowths of chalcopyrite-digenite-enargite-tennantite. **H:** Intergrowths of chalcopyrite-digenite-enargite-tennantite. **A-H:** VALDD13-14\_479. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; dg = digenite; eng = enargite; py = pyrite; po = pyrrhotite; tnt = tennantite.



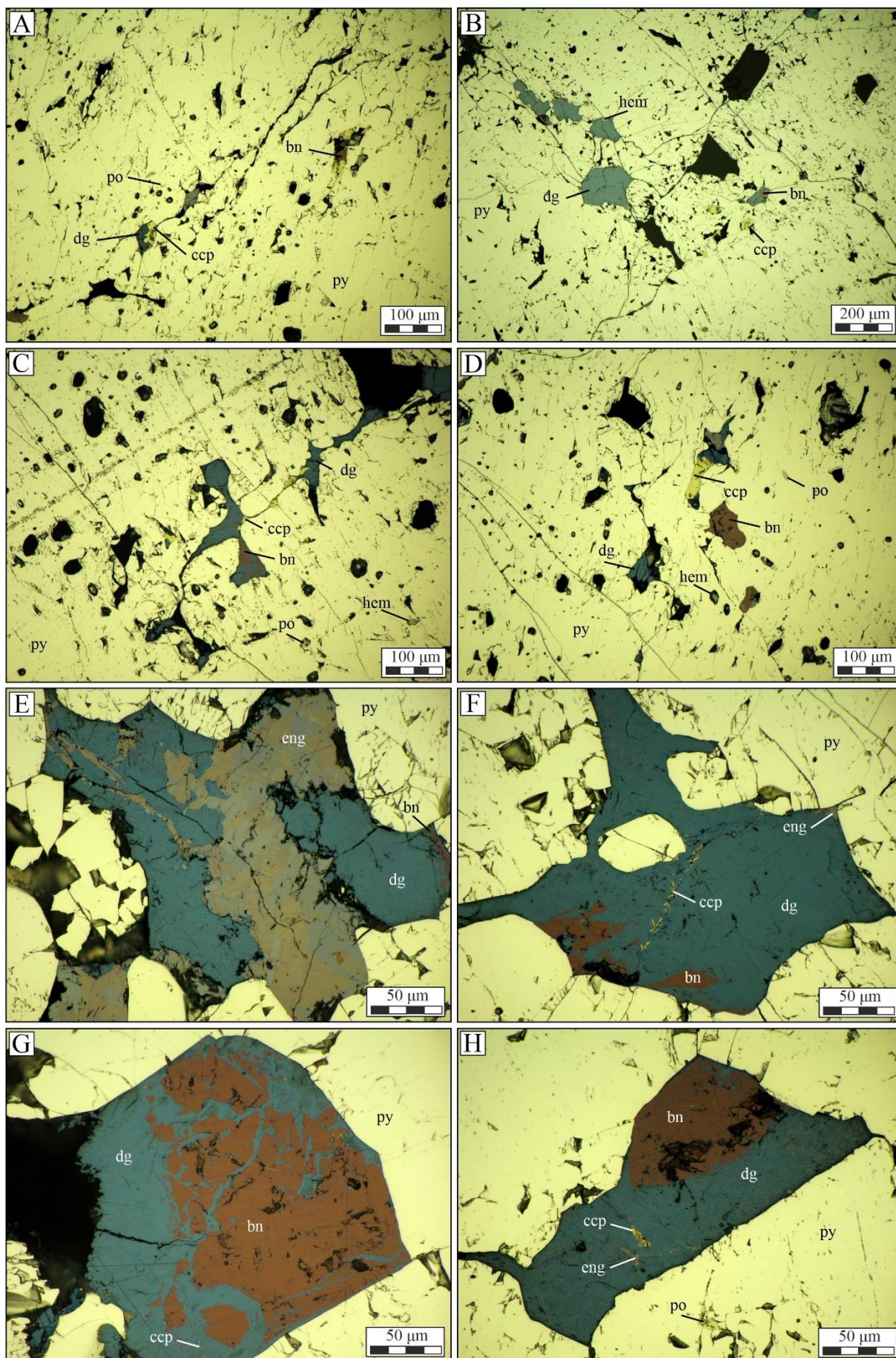
**Fig. A2-7. A:** Pyrite overgrown by chalcopyrite-digenite-enargite. Pyrite contains hematite and bornite inclusions. **B:** Pyrite overgrown by chalcopyrite-digenite-enargite. **C:** Pyrite overgrown by chalcopyrite-digenite-enargite. Pyrite contains bornite, bornite-digenite, and chalcopyrite inclusions. **D:** Pyrite and hematite overgrow by chalcopyrite-digenite-enargite. **E:** Pyrite overgrown by chalcopyrite-digenite-enargite. Pyrite contains bornite-chalcopyrite-digenite inclusions. **F:** Pyrite overgrown by chalcopyrite-digenite-enargite. Pyrite contains small bornite-chalcopyrite-digenite and magnetite inclusions. **G:** Pyrite overgrown by chalcopyrite-digenite-enargite. Pyrite contains small bornite-digenite inclusions. **H:** Pyrite overgrown by chalcopyrite-digenite-enargite. Pyrite contains small bornite-digenite inclusions. **A-H:** VALDD13-14\_493. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; dg = digenite; eng = enargite; hem = hematite; py = pyrite.



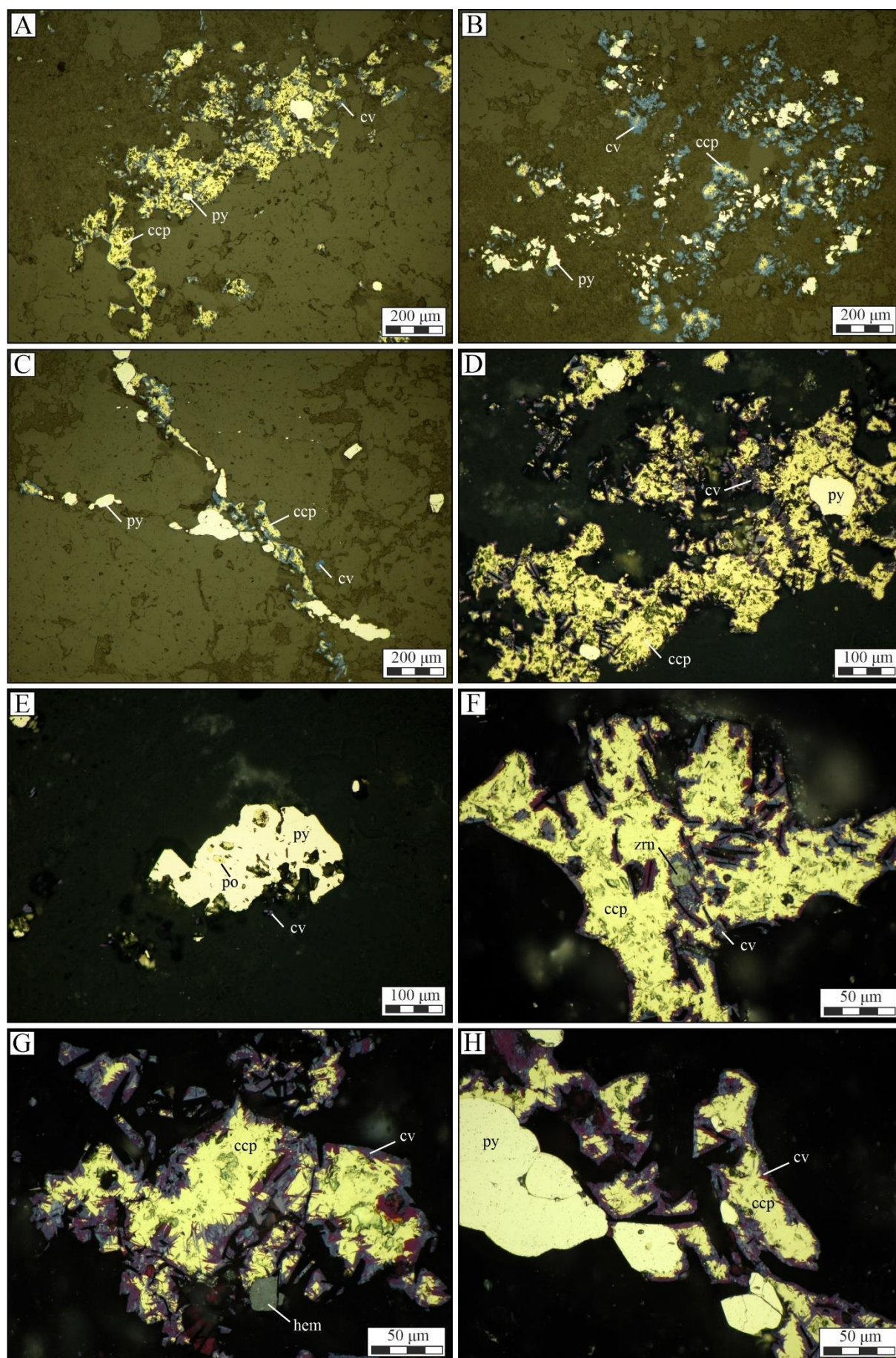
**Fig. A2-8.** **A:** Pyrite overgrown by digenite-enargite with minor covellite; covellite results from replacement after chalcopyrite. **B:** Pyrite overgrown by digenite-enargite with minor covellite; covellite results from replacement after chalcopyrite. **C:** Pyrite overgrown by digenite-enargite with minor chalcopyrite and covellite; covellite results from replacement after chalcopyrite. **D:** Pyrite overgrown by digenite-enargite with minor bornite, chalcopyrite, and covellite; covellite results from replacement after chalcopyrite. **E:** Pyrite overgrown by digenite-enargite with minor bornite, chalcopyrite and covellite; covellite results from replacement after chalcopyrite. Pyrite contains small bornite-digenite and chalcopyrite inclusions. **F:** Pyrite overgrown by digenite-enargite with minor chalcopyrite and covellite; covellite results from replacement after chalcopyrite. Pyrite contains chalcopyrite-bornite-digenite and hematite inclusions. **G:** Pyrite overgrown by digenite-enargite with minor chalcopyrite and covellite; covellite results from replacement of chalcopyrite. Pyrite contains bornite-digenite inclusions. **H:** Pyrite overgrown by digenite-enargite. Pyrite contains chalcopyrite-digenite and bornite inclusions. **A-H:** VALDD13-14\_538. **A-H:** All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; cv = covellite; dg = digenite; eng = enargite; hem = hematite; py = pyrite.



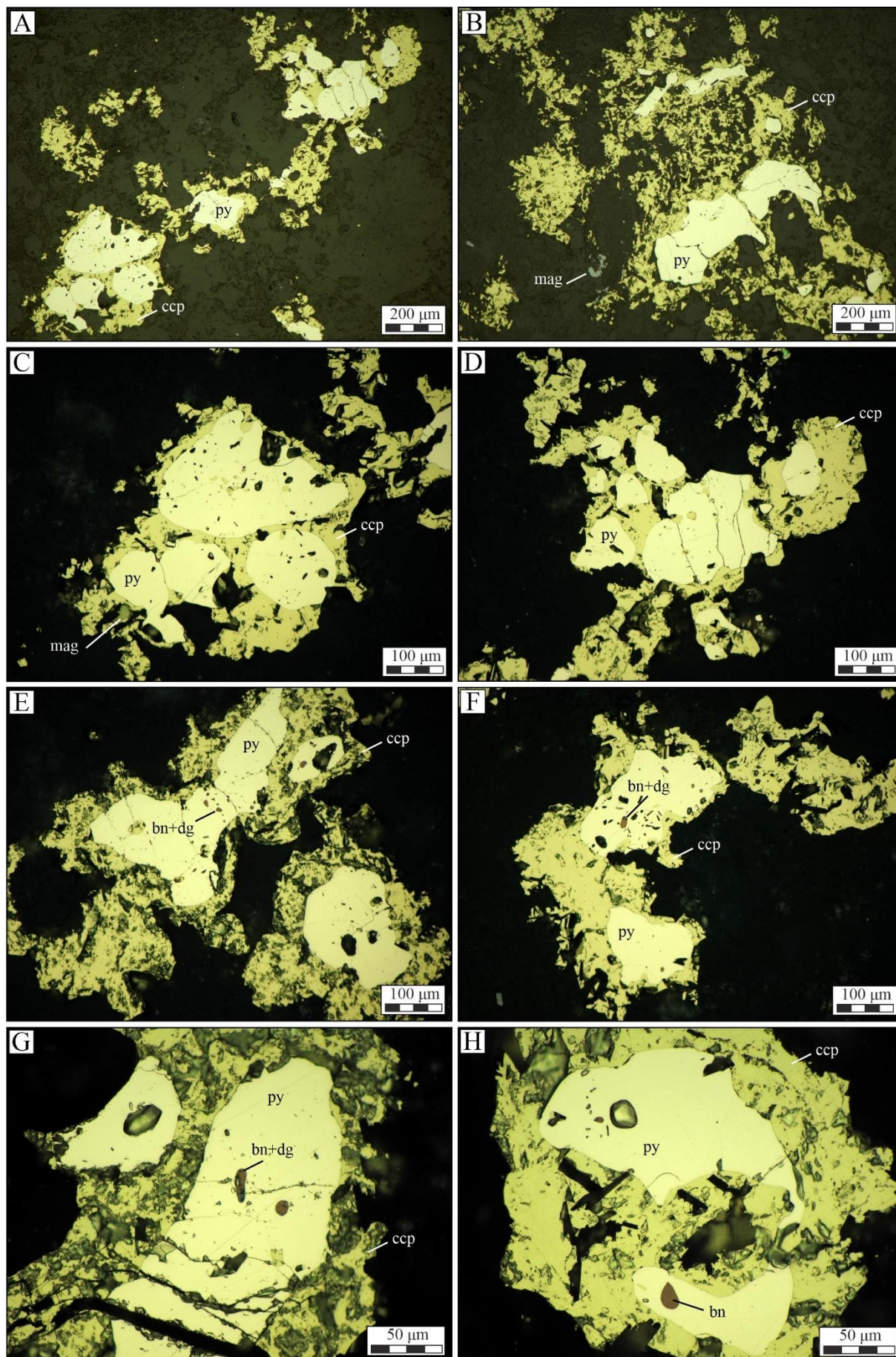
**Fig. A2-9.** **A:** Pyrite and magnetite, where pyrite has small magnetite and chalcopyrite inclusions. **B:** Pyrite, chalcopyrite, covellite after chalcopyrite, and digenite-enargite. **C:** Pyrite and magnetite. Magnetite contains small bornite, chalcopyrite, and pyrite inclusions. **D:** Pyrite and a molybdenite flake. Pyrite contains tiny bornite-digenite inclusions. **E:** Pyrite intergrown with magnetite. Pyrite contains bornite-digenite inclusions. **F:** Pyrite intergrown with magnetite. Magnetite contains small bornite-digenite and chalcopyrite inclusions. Native gold sits in voids of pyrite. **G:** Pyrite intergrown with magnetite. Pyrite contains small chalcopyrite and bornite-digenite inclusions. **H:** Pyrite intergrown with magnetite. Pyrite contains small bornite and bornite-digenite inclusions. Hematite contains small inclusions of covellite after chalcopyrite. **A-H:** VALDD13-14\_557. All photomicrographs are taken in oil. Abbreviations: Au = native gold; bn = bornite; ccp = chalcopyrite; dg = digenite; eng = enargite; mag = magnetite; mol = molybdenite; py = pyrite.



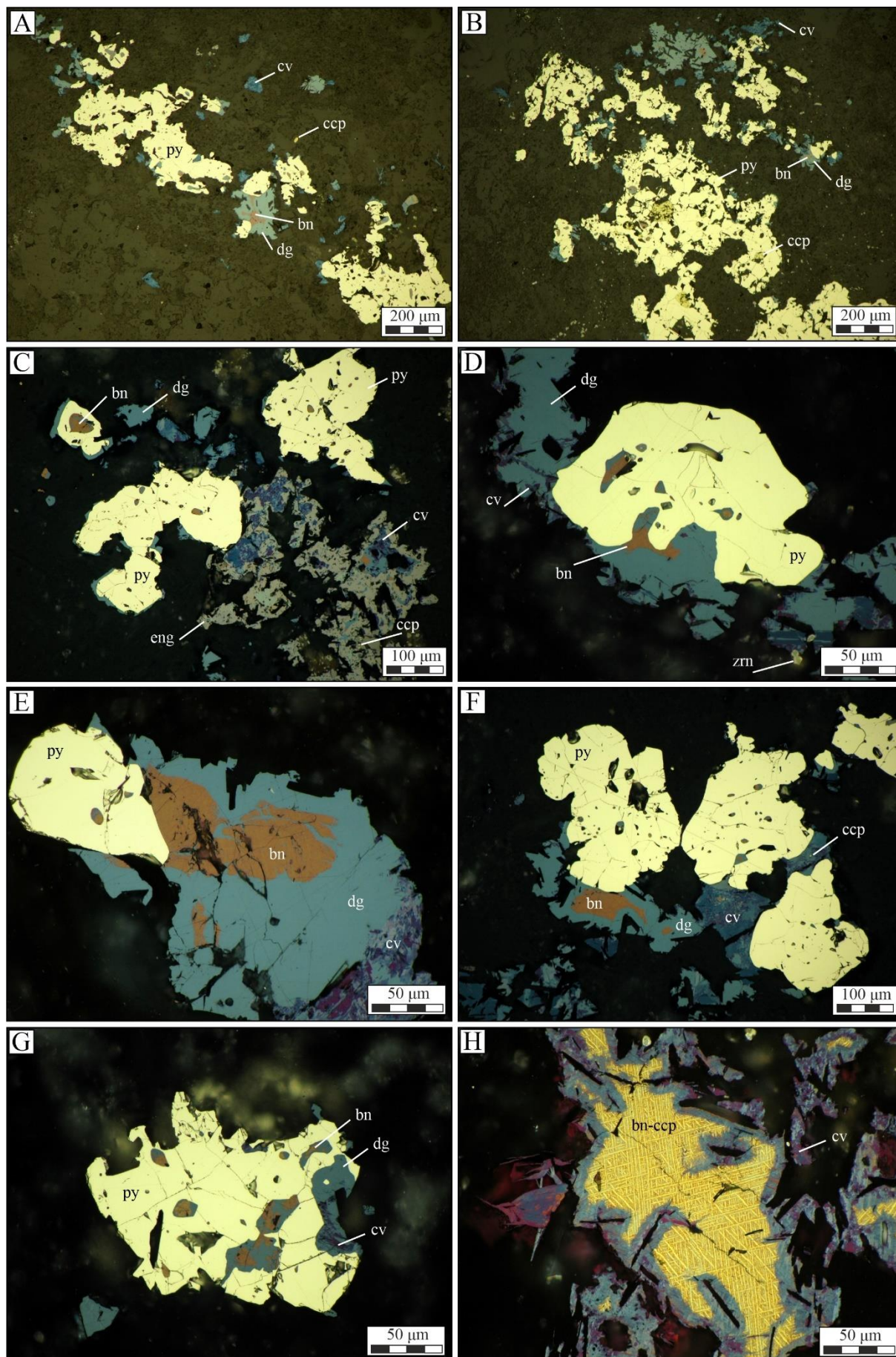
**Fig. A2-10.** **A:** Pyrrhotite and bornite-chalcopyrite-digenite inclusions in massive pyrite. **B:** Bornite-chalcopyrite-digenite and hematite inclusions in massive pyrite. Magnetite inclusions are likely earlier than the others. **C:** Bornite-chalcopyrite-digenite, hematite, and pyrrhotite inclusions in massive pyrite. **D:** Bornite-chalcopyrite-digenite, hematite, and pyrrhotite inclusions in massive pyrite. **E:** Bornite-digenite-enargite inclusion in massive pyrite. **F:** Bornite-chalcopyrite-digenite-enargite inclusion in pyrite. **G:** Bornite-chalcopyrite-digenite inclusion in pyrite. **H:** Bornite-chalcopyrite-digenite-enargite inclusion in pyrite. **A-H:** VALDD13-14\_631. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; hem = hematite; py = pyrite; po = pyrrhotite.



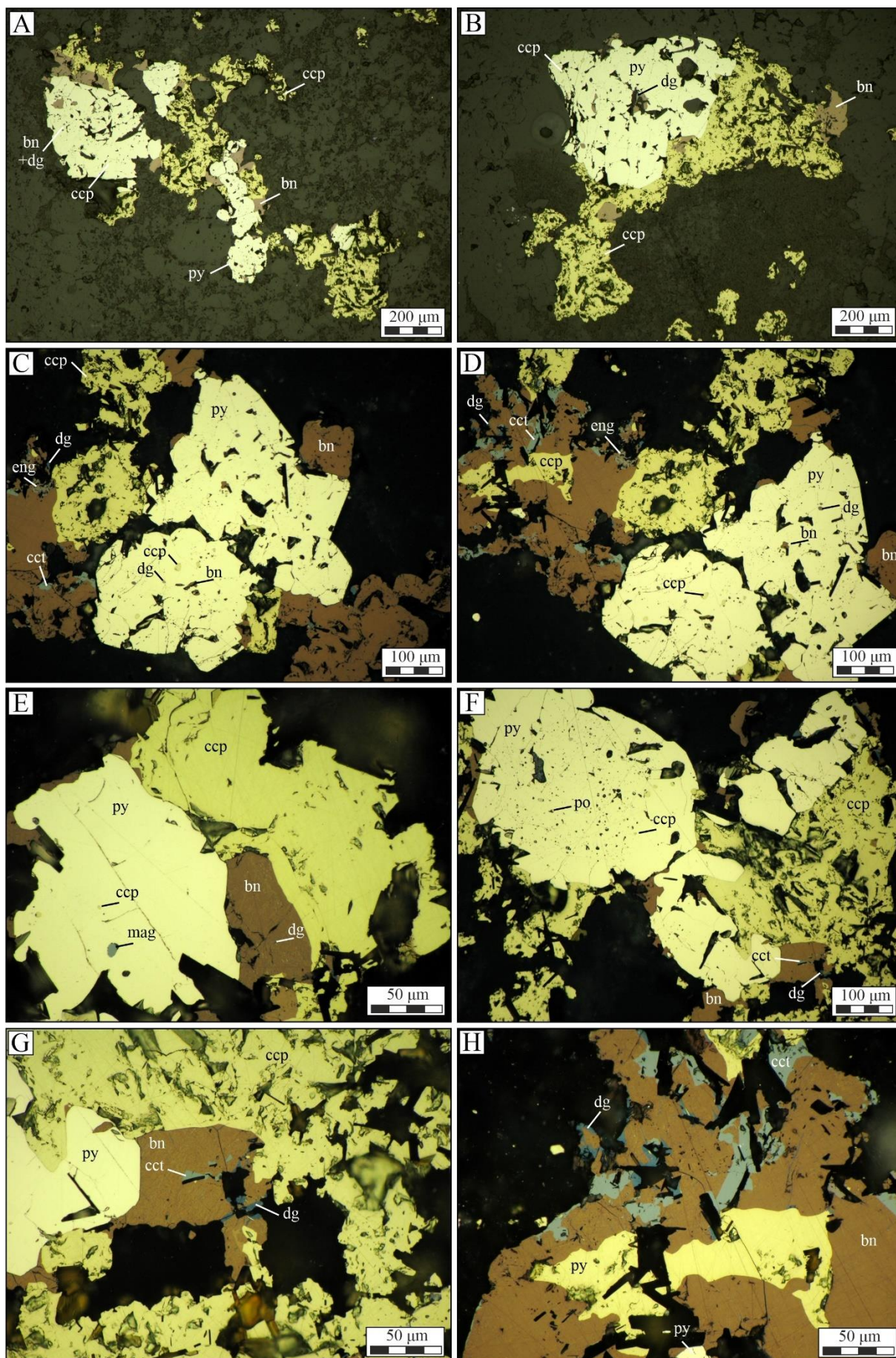
**Fig. A2-11. A-D:** Pyrite overgrown by chalcopyrite. Chalcopyrite shows incipient replacement by covellite. **E:** Pyrite with pyrrhotite inclusion, surrounded by covellite. **F:** Chalcopyrite shows incipient replacement by covellite along borders. Inclusion in the center is zircon. **G:** Chalcopyrite shows incipient replacement by covellite along borders. Magnetite is entirely replaced by hematite. **H:** Pyrite overgrown by chalcopyrite which shows incipient replacement by covellite. **A-H:** VALDD13-14\_687. All photomicrographs are taken in oil. Abbreviations: ccp = chalcopyrite; cv = covellite; hem = hematite; py = pyrite; po = pyrrhotite; zrn = zircon.



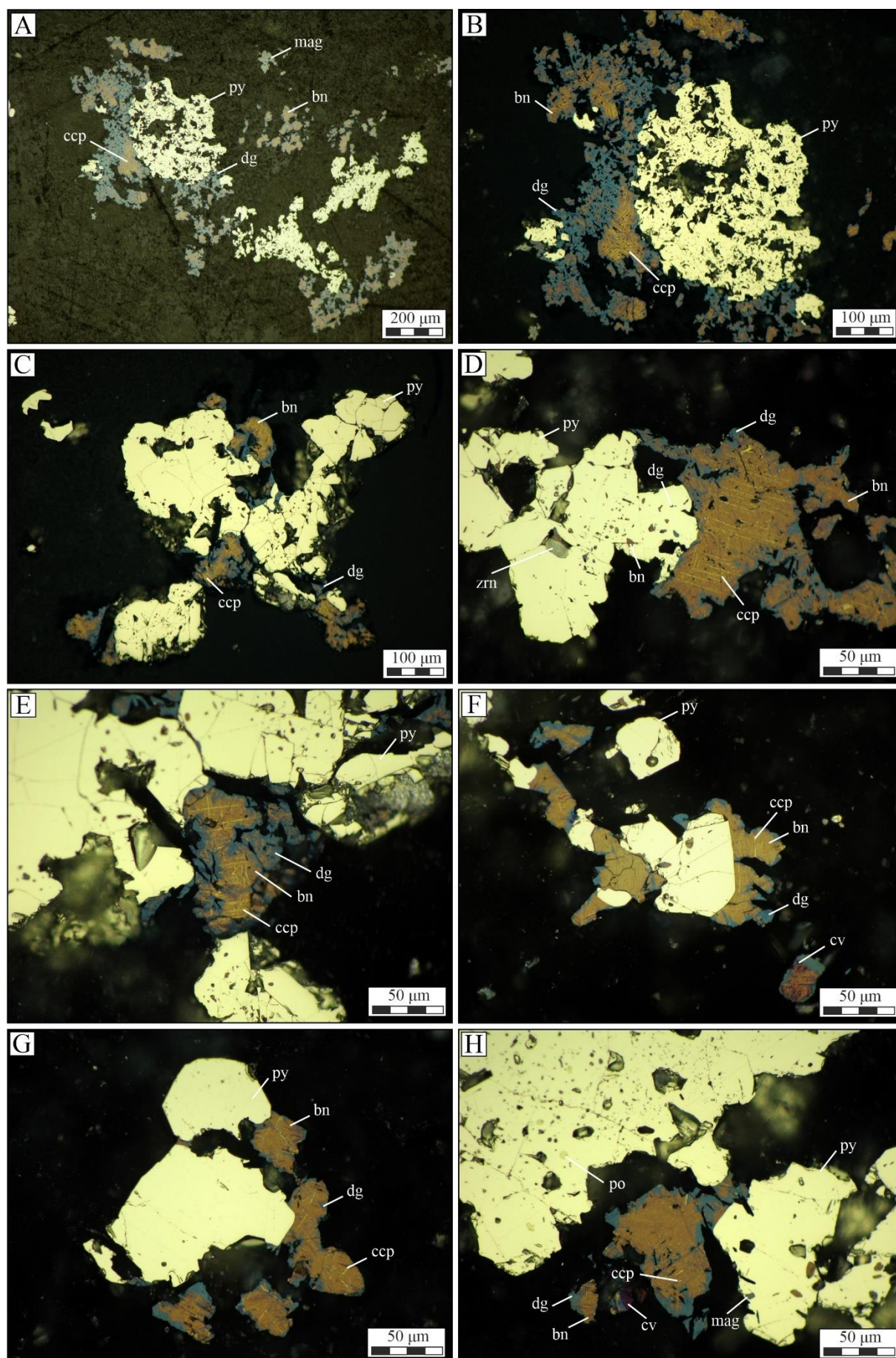
**Fig. A2-12.** **A:** Pyrite overgrown by chalcopyrite. **B:** Pyrite and magnetite overgrown by chalcopyrite. **C:** Pyrite and magnetite overgrown by chalcopyrite. **D:** Pyrite overgrown by chalcopyrite. **E:** Pyrite overgrown by chalcopyrite. Pyrite contains small bornite-digenite inclusions. **F:** Pyrite overgrown by chalcopyrite. Pyrite contains small bornite-digenite inclusions. **G:** Pyrite overgrown by chalcopyrite. Pyrite contains a small bornite-digenite inclusions. **H:** Pyrite overgrown by chalcopyrite. Pyrite contains a small bornite inclusion. **A-H:** VALDD13-14\_734. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; dg = digenite; mag = magnetite; py = pyrite.



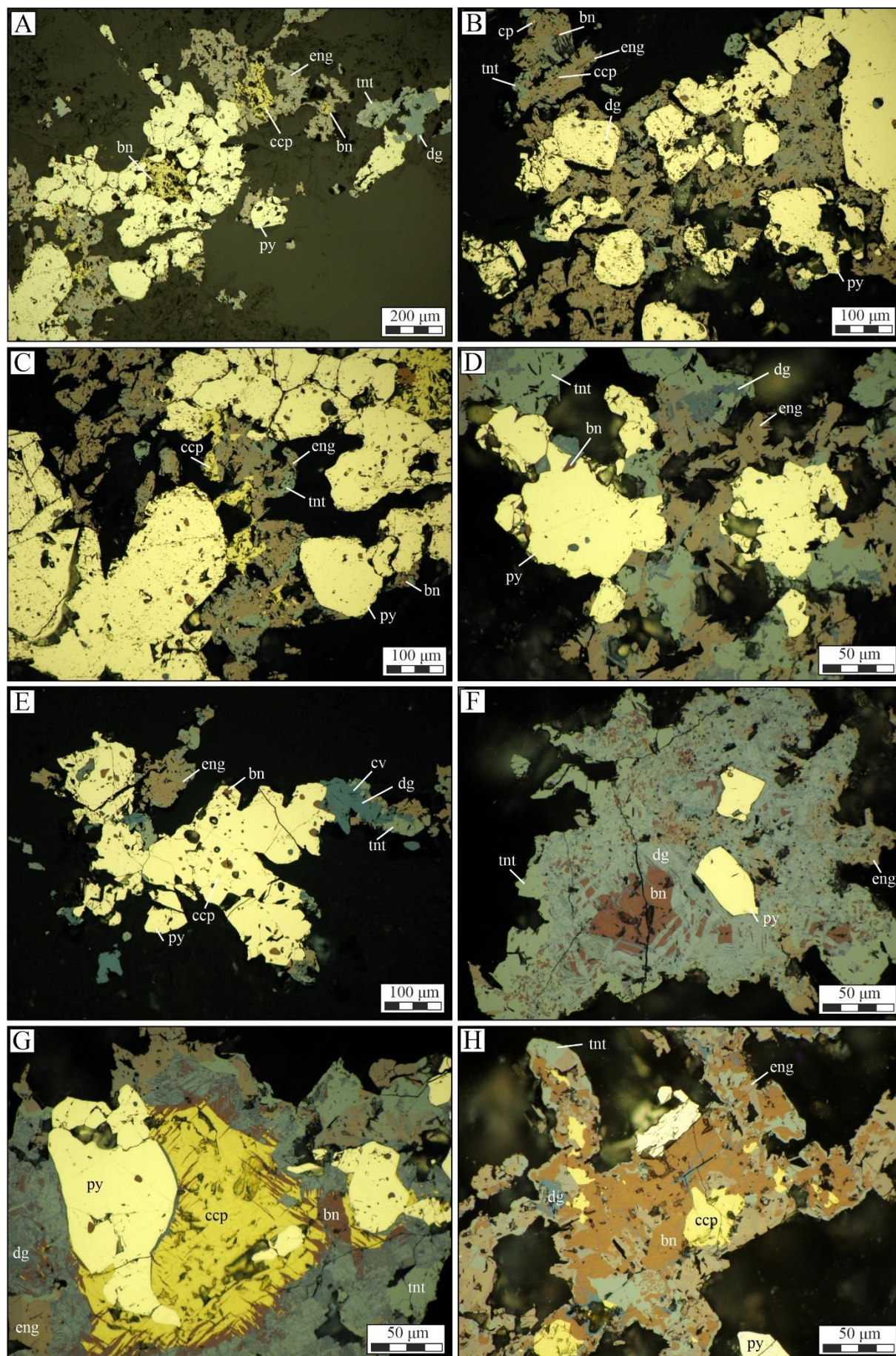
**Fig. A2-13.** **A:** Pyrite overgrown by bornite-digenite-covellite; covellite is after chalcopyrite. Pyrite contains small bornite-digenite inclusions. **B:** Pyrite overgrown by bornite-digenite-covellite, with covellite after chalcopyrite. Pyrite contains chalcopyrite, bornite, bornite-digenite and digenite inclusions. **C:** Pyrite overgrown by bornite-chalcopyrite-digenite-enargite. Pyrite contains small inclusions of bornite-digenite. Covellite is probably after chalcopyrite. **D:** Pyrite overgrown by bornite-digenite. Covellite is likely after chalcopyrite. Grey minerals with interior reflections are zircon grains. **E:** Pyrite overgrown by bornite-digenite-covellite. Pyrite contains bornite-digenite inclusions. **F:** Pyrite overgrown by bornite-digenite-chalcopyrite-covellite, where covellite results from replacement after chalcopyrite. Pyrite contains small bornite-digenite inclusions. **G:** Pyrite with bornite-digenite-covellite inclusions. **H:** Bornite with chalcopyrite laminae and rims of covellite. **A-H:** VALDD13-14\_753. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; cct = chalcocite; cv = covellite; dg = digenite; po = pyrrhotite; py = pyrite; zrn = zircon.



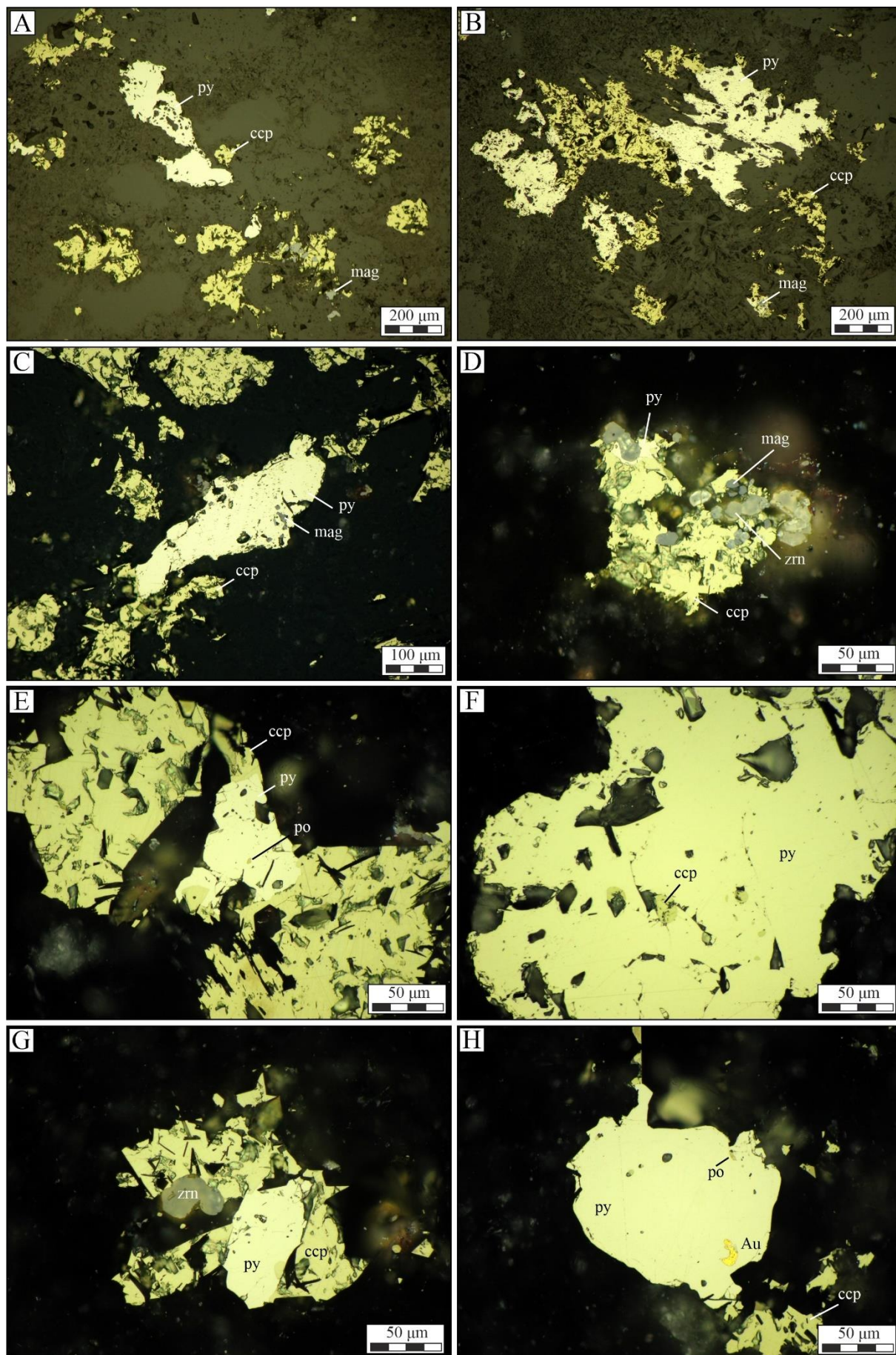
**Fig. A2-14.** **A:** Pyrite overgrown by bornite-chalcopyrite. Pyrite contains small bornite-digenite inclusions. **B:** Pyrite overgrown by bornite-chalcopyrite. Pyrite contains small bornite-digenite inclusions. **C:** Pyrite overgrown by bornite-chalcocite-chalcopyrite-digenite-enargite. Pyrite contains small inclusions of bornite-chalcopyrite-digenite. **D:** Pyrite overgrown by bornite-chalcocite-chalcopyrite-digenite-enargite. Pyrite contains small bornite-chalcopyrite-digenite inclusions. **E:** Pyrite overgrown by bornite-chalcopyrite-digenite. Pyrite contains small chalcopyrite and magnetite inclusions. Bornite shows tiny exsolution laminae of chalcopyrite and digenite. **F:** Pyrite overgrown by bornite-chalcocite-chalcopyrite-digenite. Pyrite contains small pyrrhotite and chalcopyrite inclusions. **G:** Pyrite overgrown by bornite-chalcocite-chalcopyrite-digenite. Bornite shows tiny exsolution laminae of chalcopyrite. **H:** Bornite-chalcocite-chalcopyrite-digenite assemblage with pyrite. **A-H:** VALDD13-14\_813. All photomicrographs are taken in oil. Abbreviations: bn = bornite; cct = chalcocite; ccp = chalcopyrite; dg = digenite; eng = enargite; mag = magnetite; py = pyrite.



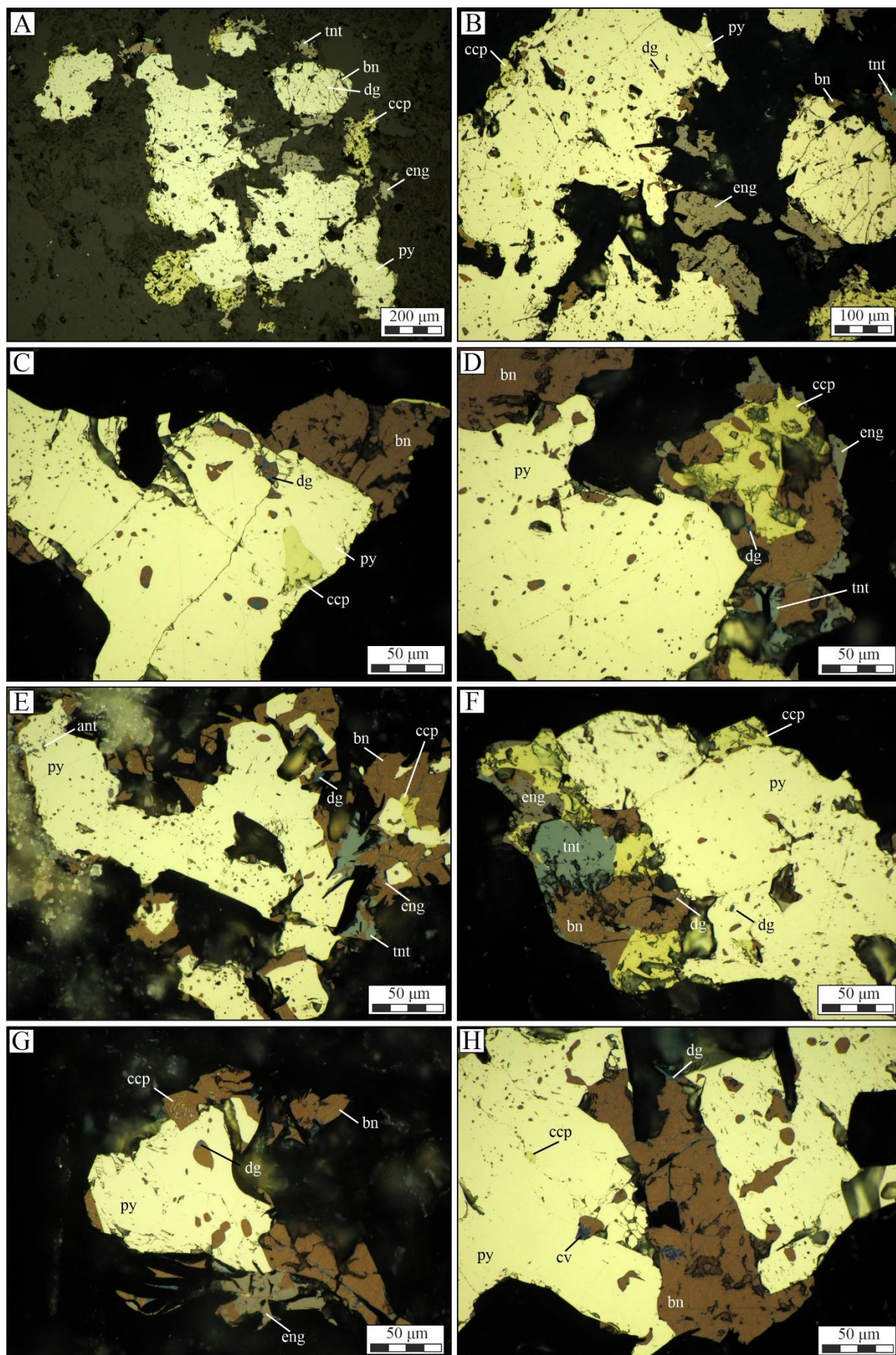
**Fig. A2-15. A:** Pyrite overgrown by bornite-digenite. Bornite shows exsolution laminae of chalcopyrite. Magnetite occurs beside. **B:** Pyrite overgrown by bornite-digenite. Bornite shows exsolution laminae of chalcopyrite. **C:** Pyrite overgrown by bornite-digenite. Bornite shows exsolution laminae of chalcopyrite. **D:** Pyrite overgrown by bornite-digenite. Pyrite contains bornite-digenite inclusions. Bornite shows exsolution laminae of chalcopyrite. **E:** Pyrite overgrown by bornite-digenite. Bornite shows exsolution laminae of chalcopyrite. **F:** Pyrite overgrown by bornite-digenite. Inclusions in pyrite are bornite-digenite. Bornite shows exsolution laminae of chalcopyrite. Covellite is after chalcopyrite. **G:** Pyrite overgrown by bornite-digenite. Bornite shows exsolution laminae of chalcopyrite. **H:** Pyrite overgrown by bornite-digenite. Bornite shows exsolution laminae of chalcopyrite. Covellite is after chalcopyrite. **A-H:** VALDD13-14\_843. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; cv = covellite; dg = digenite; mag = magnetite; po = pyrrhotite; py = pyrite; zrn = zircon.



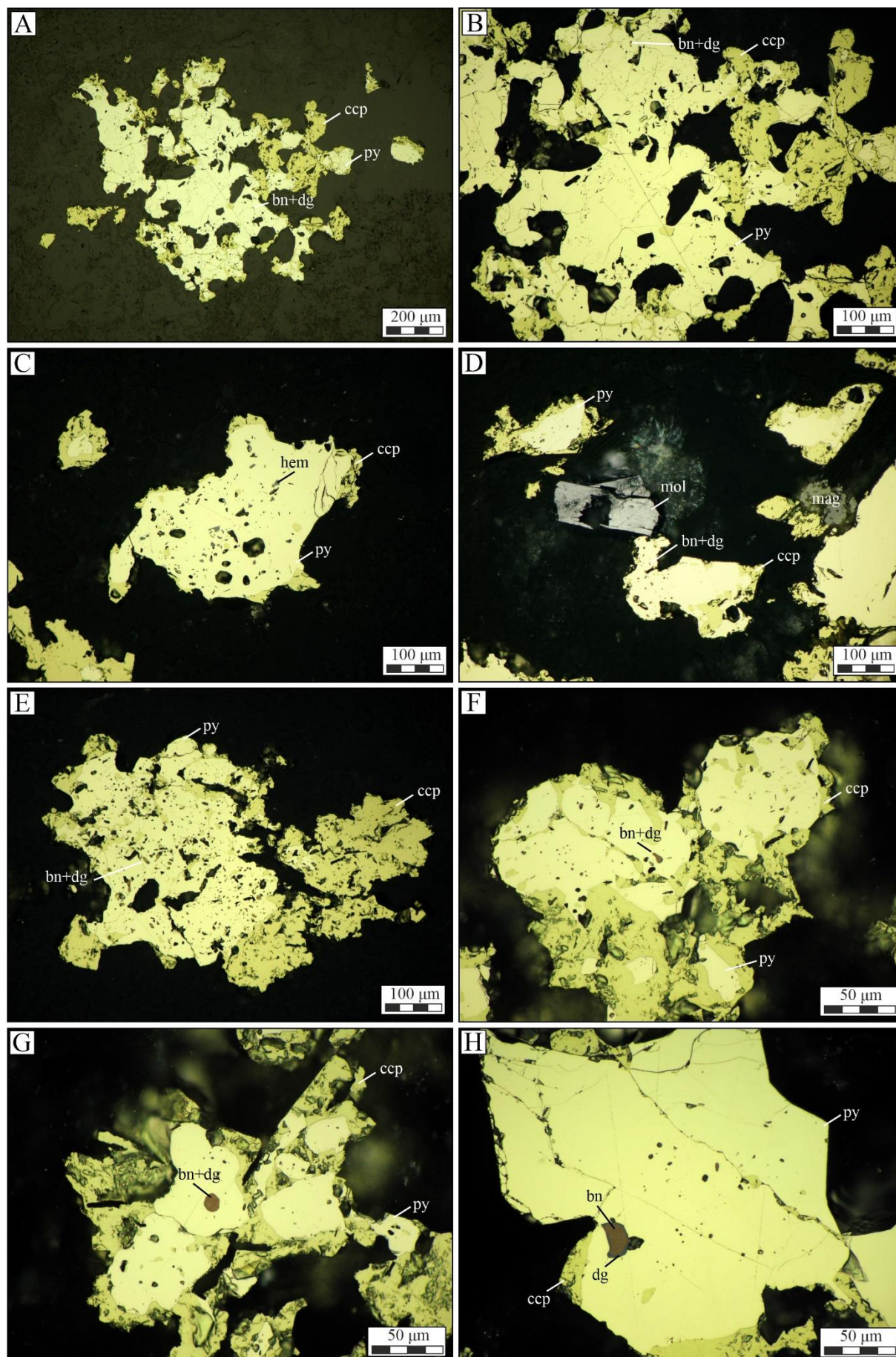
**Fig. A2-16.** **A:** Pyrite overgrown by bornite-chalcocite-chalcopyrite-digenite-enargite. Pyrite contains inclusions of all Fe sulfides. **B:** Pyrite overgrown by bornite- chalcopyrite-digenite-enargite-tennantite. Pyrite contains intergrown inclusions of all Cu sulfides. **C:** Pyrite overgrown by bornite -chalcopyrite-enargite-tennantite. Pyrite contains intergrown inclusions of all Cu sulfides. **D:** Pyrite overgrown by bornite-chalcopyrite-digenite-enargite-tennantite. Pyrite contains bornite-digenite inclusions. **E:** Pyrite overgrown by bornite- digenite-enargite-tennantite-covellite. Pyrite contains chalcopyrite and bornite-enargite inclusions. **F:** Pyrite overgrown by bornite-digenite-enargite-tennantite. **G:** Pyrite overgrown by bornite-chalcopyrite-digenite-enargite-tennantite. **H:** Pyrite with bornite-chalcopyrite-digenite-enargite-tennantite. **A-H:** VALDD13-14\_913. All photomicrographs are taken in oil. Abbreviations: bn = bornite; cp = chalcopyrite; dg = digenite; eng = enargite; py = pyrite; tnt = tennantite.



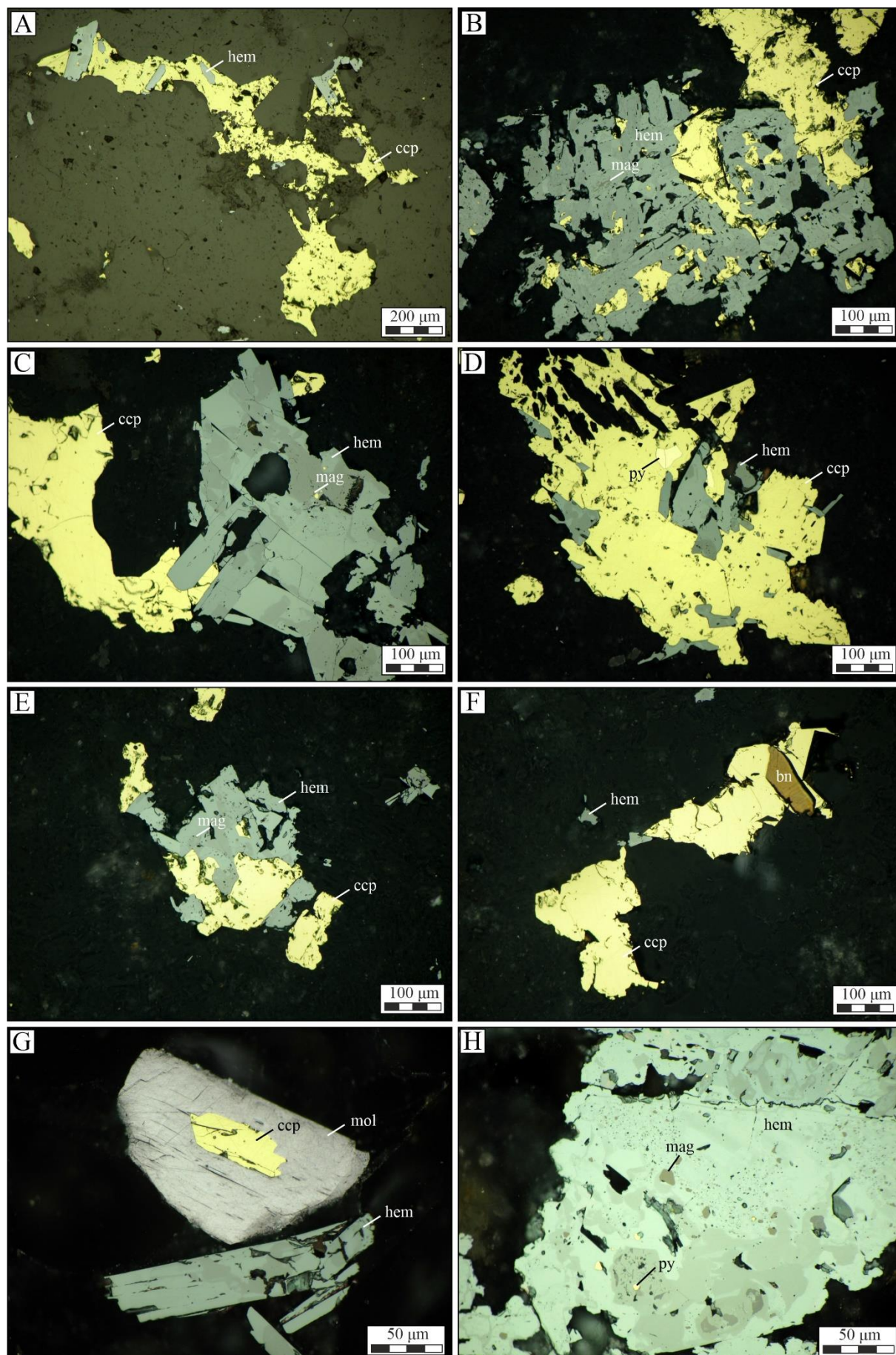
**Fig. A2-17.** **A:** Magnetite overgrown by chalcopyrite with pyrite. **B:** Pyrite and magnetite overgrown by chalcopyrite. **C:** Pyrite with magnetite inclusions, overgrown by chalcopyrite. **D:** Pyrite and magnetite overgrown by chalcopyrite. Pyrite contains zircon grains. **E:** Pyrite overgrown by chalcopyrite. Pyrite contains pyrrhotite inclusion. **F:** Pyrite with chalcopyrite inclusions. **G:** Pyrite and zircon overgrown by chalcopyrite. **H:** Pyrite overgrown by chalcopyrite. Pyrite contains pyrrhotite and gold inclusions. **A-H:** VALDD13-14\_942. All photomicrographs are taken in oil. Abbreviations: Au = native gold; ccp = chalcopyrite; mag = magnetite; po = pyrrhotite; py = pyrite; zrn = zircon.



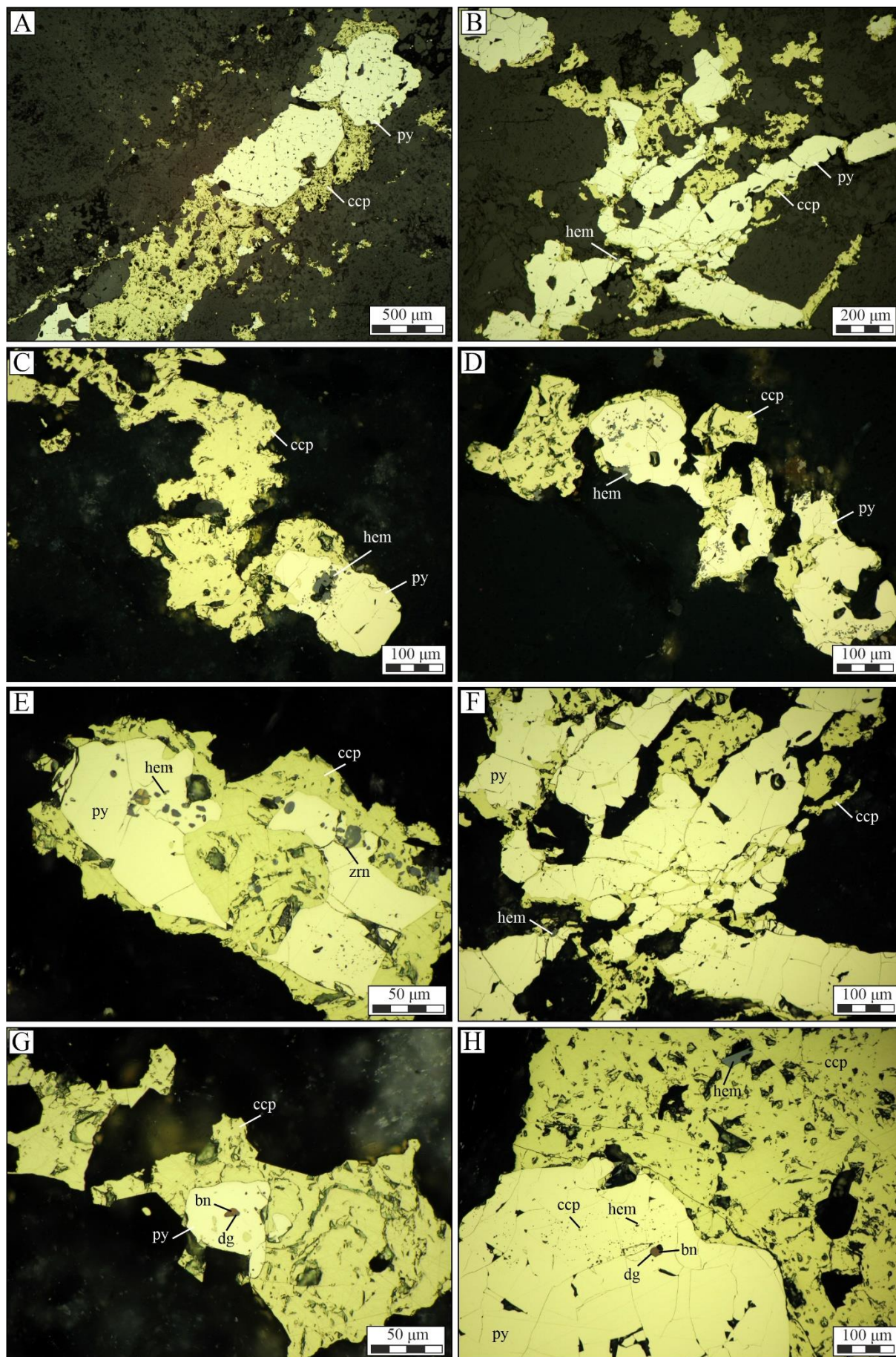
**Fig. A2-18.** **A:** Pyrite overgrown by bornite-chalcopyrite-enargite-tennantite. Pyrite contains inclusions of bornite-chalcopyrite-digenite. **B:** Pyrite overgrown by bornite-chalcopyrite-tennantite-enargite. Pyrite contains bornite-chalcopyrite-digenite. **C:** Pyrite overgrown by bornite-chalcopyrite. Pyrite contains bornite-digenite inclusions. **D:** Pyrite overgrown by bornite-chalcopyrite-digenite-enargite-tennantite. Pyrite contains bornite-chalcopyrite-digenite inclusions. Bornite shows faint chalcopyrite exsolution laminae. **E:** Pyrite overgrown by bornite-chalcopyrite-digenite-enargite-tennantite. Bornite shows faint exsolution laminae of chalcopyrite and is cut by fissures filled with digenite. Pyrite contains bornite-chalcopyrite and anatase inclusions. **F:** Pyrite overgrown by bornite-chalcopyrite-enargite-tennantite. Pyrite contains bornite-chalcopyrite-digenite inclusions. **G:** Pyrite overgrown by bornite-chalcopyrite-digenite-enargite. Pyrite contains bornite-digenite inclusions. Bornite contains chalcopyrite inclusions and shows faint chalcopyrite exsolution laminae. Bornite is cut by small fissures filled with digenite. **H:** Pyrite overgrown by bornite. Pyrite has chalcopyrite and bornite-digenite-covellite inclusions. Bornite shows faint chalcopyrite exsolution laminae and is cut by fissures filled with digenite. Larger chalcopyrite inclusions are largely replaced by covellite. **A-H:** VALDD13-14\_983. All photomicrographs are taken in oil. Abbreviations: ant = anatase; bn = bornite; ccp = chalcopyrite; cv = covellite; dg = digenite; eng = enargite; tnt = tennantite; py = pyrite.



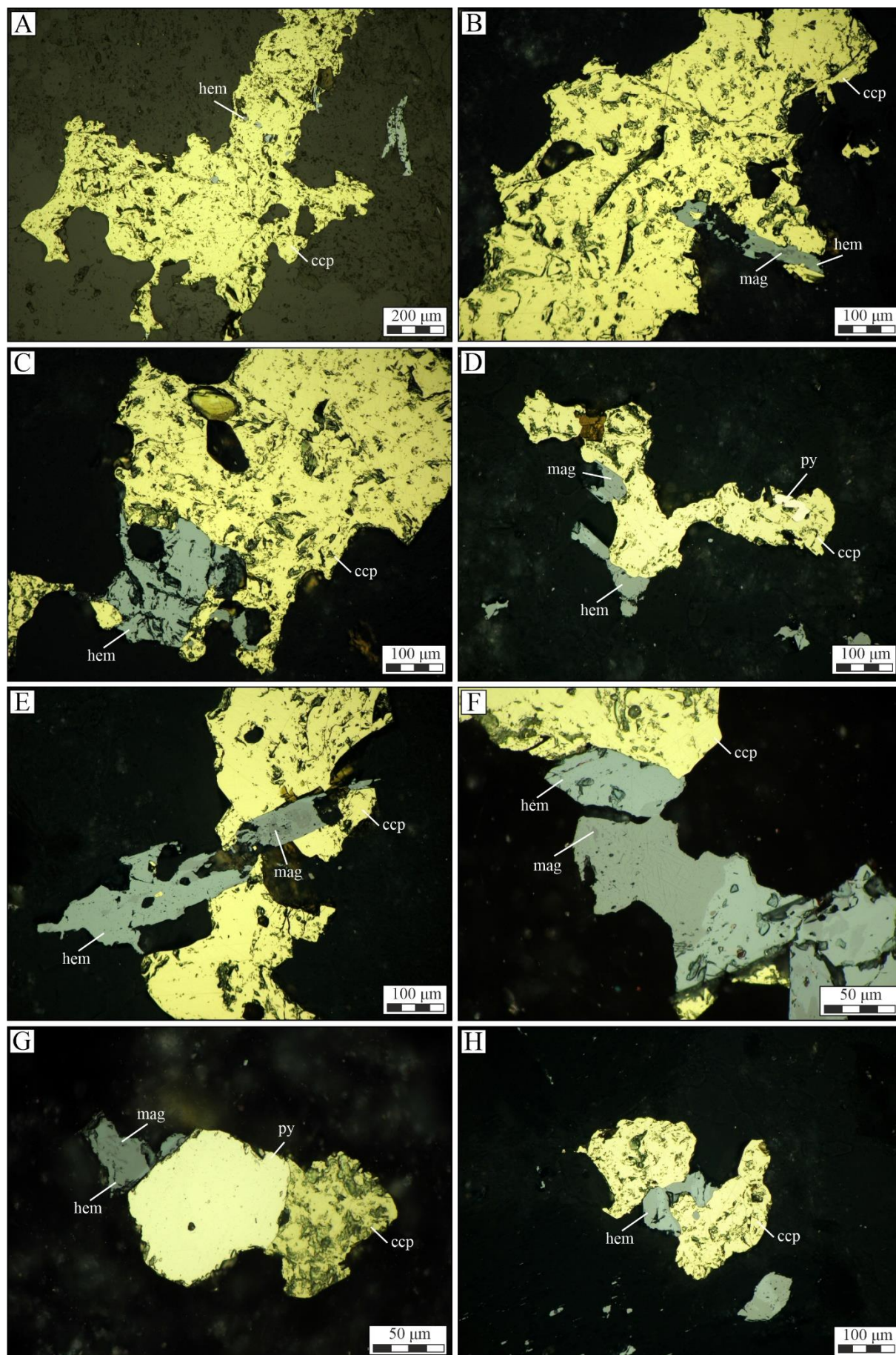
**Fig. A2-19.** **A:** Pyrite overgrown by chalcopyrite. Pyrite contains chalcopyrite and bornite-digenite inclusions. **B:** Pyrite overgrown by chalcopyrite. Pyrite contains chalcopyrite and bornite-digenite inclusions. **C:** Pyrite overgrown by chalcopyrite. Pyrite has small magnetite and chalcopyrite inclusions. **D:** Pyrite overgrown by chalcopyrite and a separate molybdenite flake. Pyrite contains chalcopyrite and bornite-digenite inclusions. **E-H:** Pyrite overgrown with chalcopyrite. Pyrite contains chalcopyrite and bornite-digenite inclusions. **A-H:** VALDD13-14\_1050. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; dg = digenite; hem = hematite; mag = magnetite; mol = molybdenite; py = pyrite.



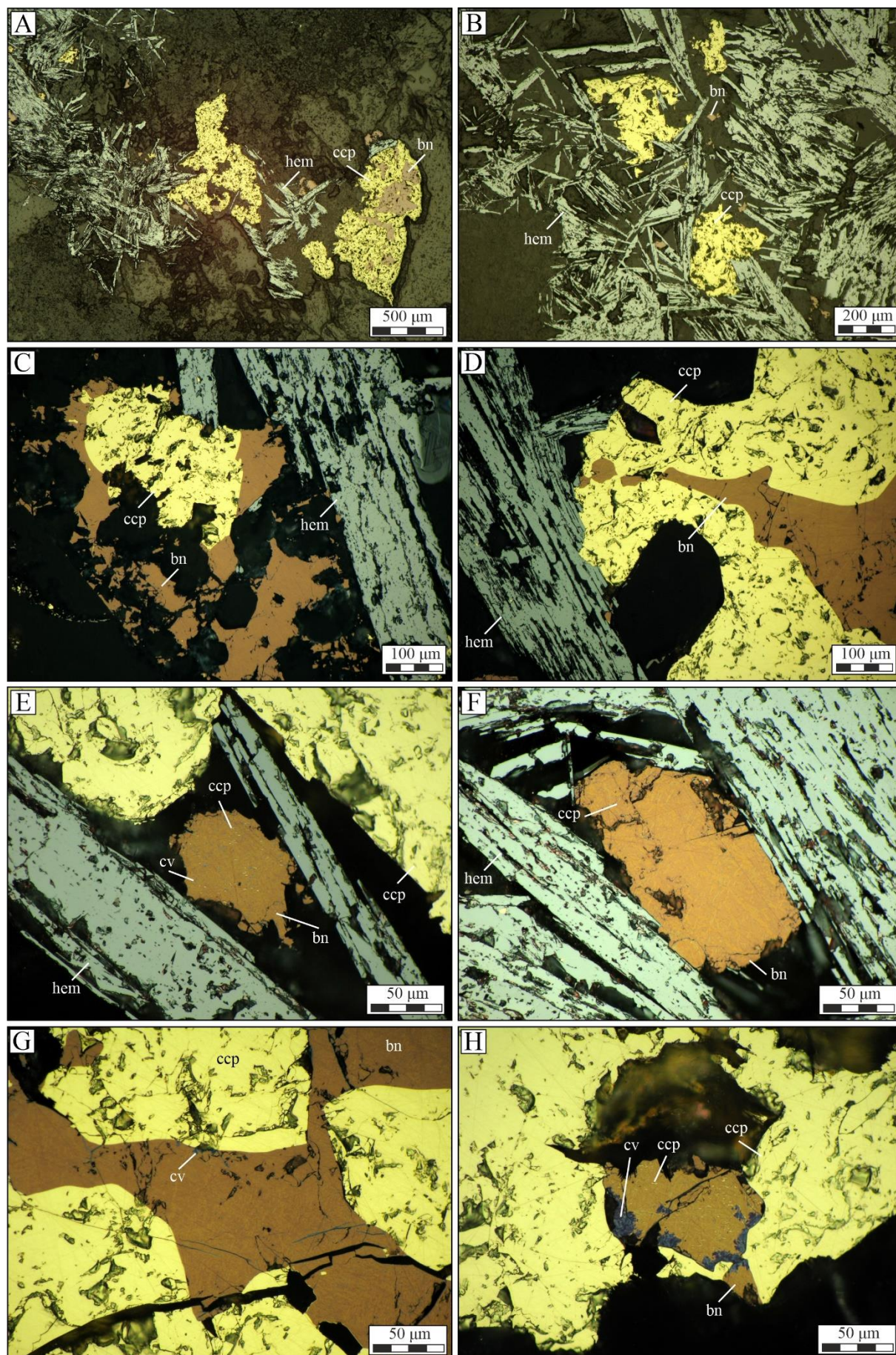
**Fig. A2-20.** **A:** Hematite overgrown by chalcopyrite. **B:** Hematite overgrown by chalcopyrite. Hematite contains small magnetite inclusions reflecting hematite after magnetite. **C:** Hematite overgrown by chalcopyrite. Hematite contains small magnetite inclusions reflecting hematite after magnetite. **D:** Hematite and pyrite overgrown by chalcopyrite. **E:** Hematite overgrown by chalcopyrite. Hematite contains small magnetite inclusions expressing hematite after magnetite. **F:** Bornite crystal enclosed in chalcopyrite. Hematite crystals occur at side. **G:** Chalcopyrite enclosed by molybdenite with separate hematite crystals. **H:** Hematite contains small magnetite and pyrite crystals. **A-H:** VALDD13-14\_1143. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; hem = hematite; mag = magnetite; mol = molybdenite.



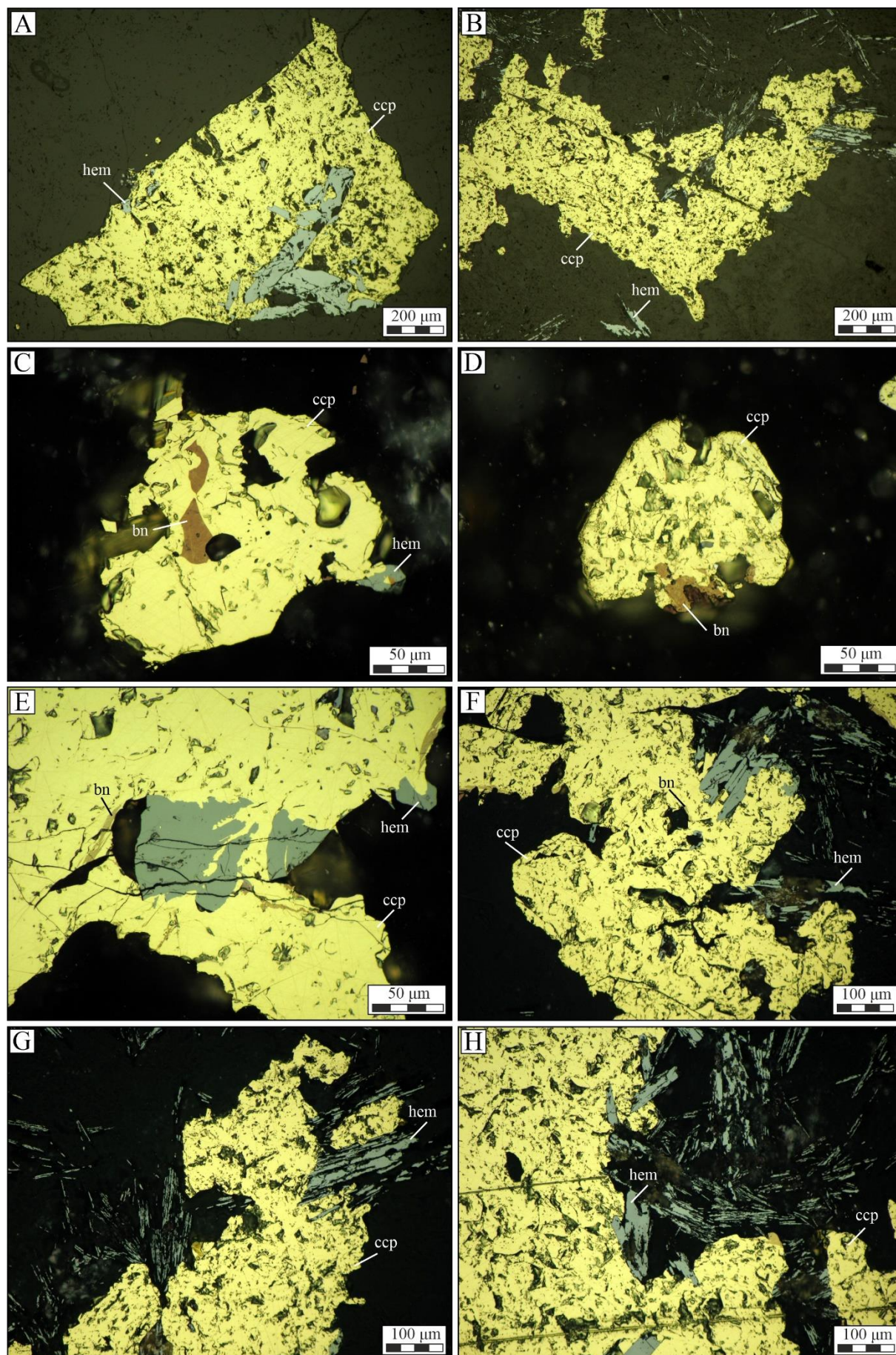
**Fig. A2-21.** **A:** Pyrite overgrown by chalcopyrite. Pyrite contains chalcopyrite inclusions. **B:** Pyrite and hematite overgrown by chalcopyrite. Pyrite contains chalcopyrite inclusions. **C:** Pyrite overgrown by chalcopyrite. Pyrite contains chalcopyrite and hematite inclusions. **D:** Pyrite and hematite overgrown by chalcopyrite. Pyrite contains chalcopyrite and hematite inclusions. **E:** Pyrite and hematite overgrown by chalcopyrite. Pyrite contains hematite and zircon inclusions. **F:** Pyrite and hematite overgrown by chalcopyrite. Pyrite contains chalcopyrite inclusions. **G:** Pyrite overgrown by chalcopyrite. Pyrite contains chalcopyrite and bornite-digenite inclusions. **H:** Pyrite and hematite overgrown by chalcopyrite. Pyrite contains chalcopyrite, hematite, and bornite-digenite inclusions. **A-H:** VALDD13-14\_1182. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; dg = digenite; hem = hematite; py = pyrite; zrn = zircon.



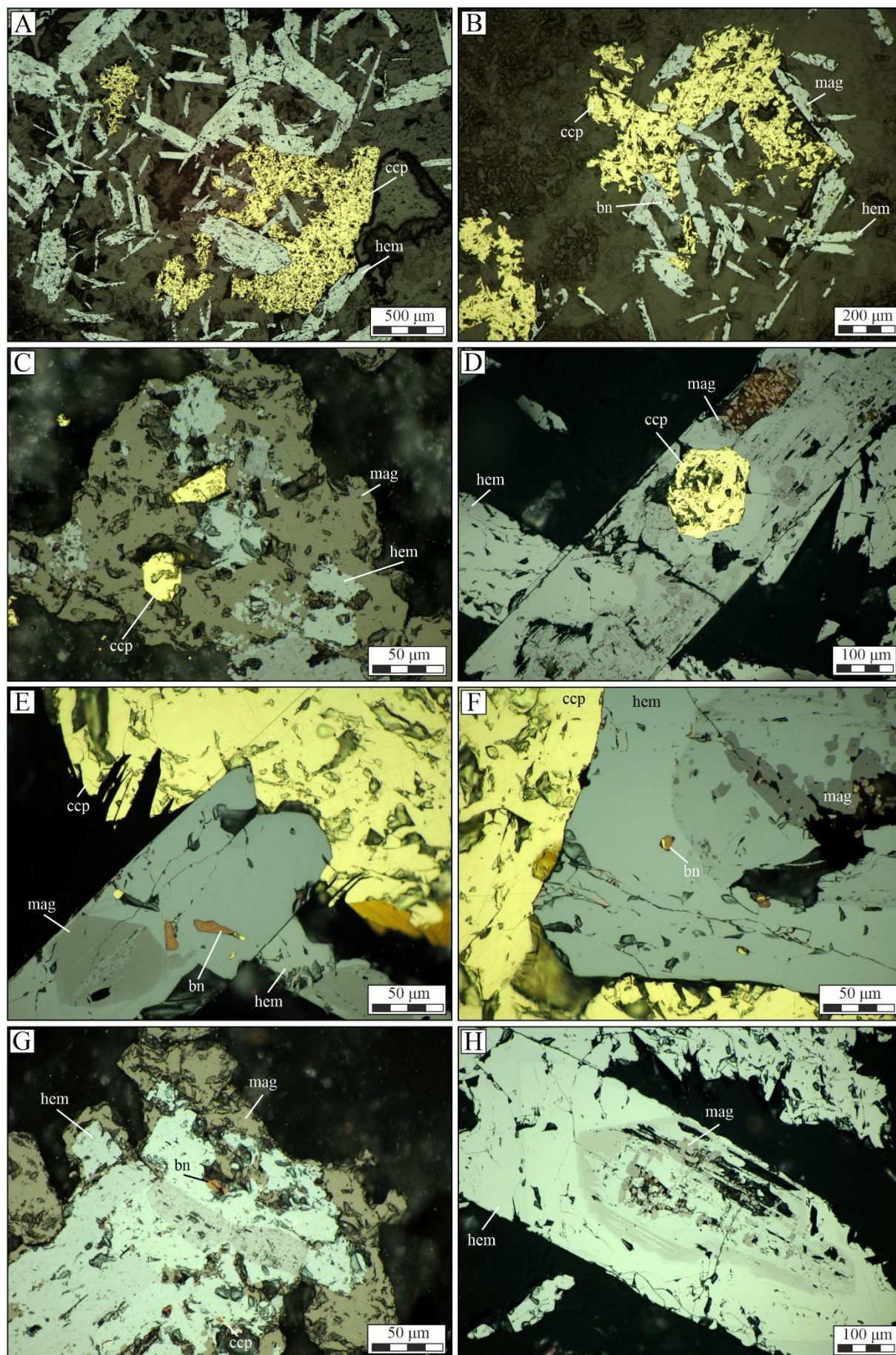
**Fig. A2-22.** **A:** Hematite overgrown by chalcopyrite. **B:** Hematite overgrown by chalcopyrite. Hematite contains remains of magnetite. **C:** Hematite overgrown by chalcopyrite. **D:** Pyrite and hematite overgrown by chalcopyrite. Hematite contains remains of magnetite. **E:** Hematite overgrown by chalcopyrite. Hematite contains inclusions of chalcopyrite and remains of magnetite. **F:** Hematite overgrown by chalcopyrite. Hematite contains remains of magnetite. **G:** Pyrite overgrown by chalcopyrite with hematite after magnetite at the side. **H:** Hematite overgrown by chalcopyrite. **A-H:** VALDD13-14\_1229. All photomicrographs are taken in oil. Abbreviations: ccp = chalcopyrite; hem = hematite; mag = magnetite; py = pyrite.



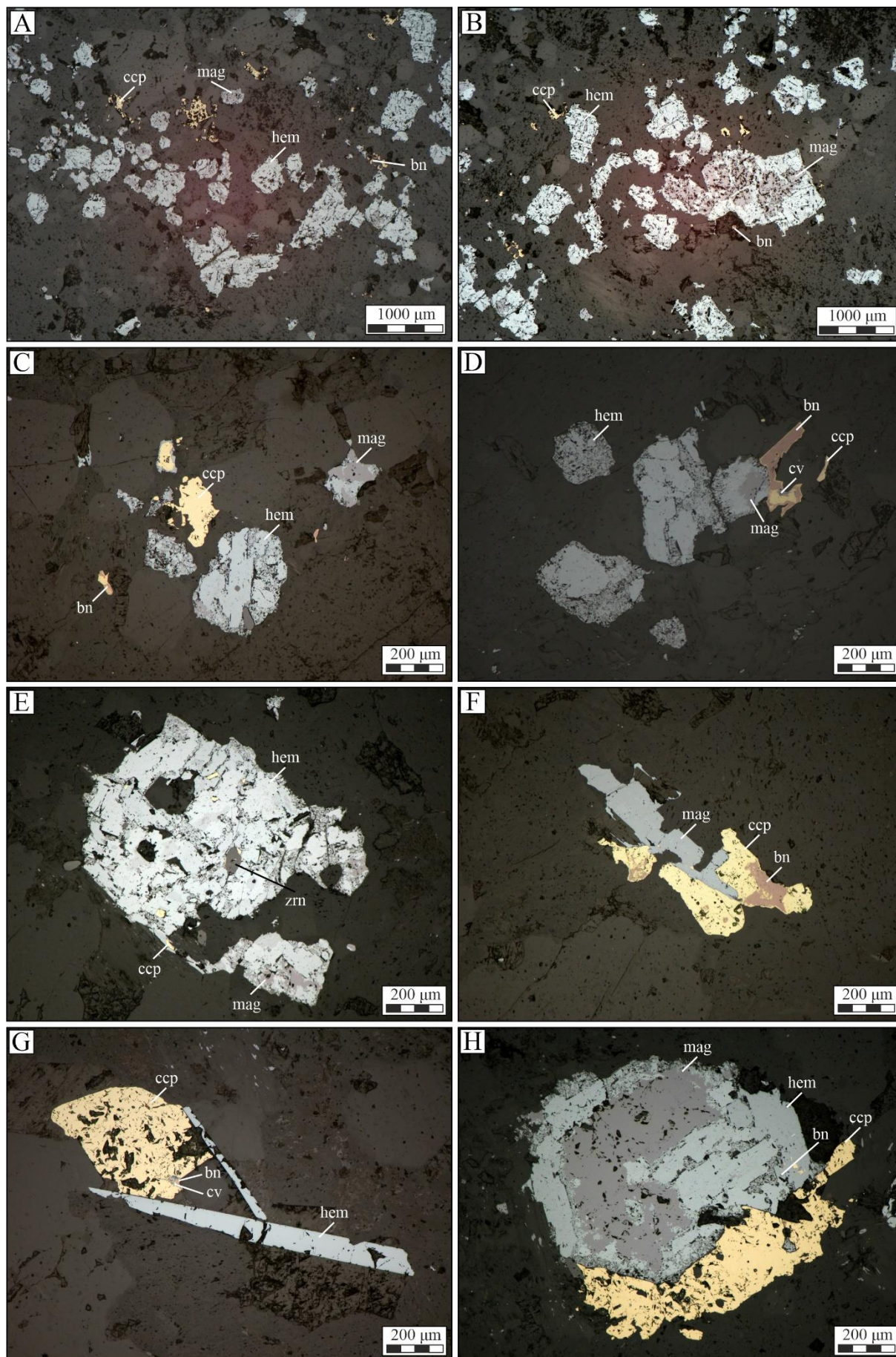
**Fig. A2-23.** **A:** Hematite overgrown by bornite-chalcopyrite. **B:** Hematite overgrown by bornite-chalcopyrite. **C:** Hematite overgrown by bornite-chalcopyrite. **D:** Hematite overgrown by bornite-chalcopyrite. **E:** Hematite with chalcopyrite and bornite. Bornite shows faint exsolutions of chalcopyrite which are partly replaced by covellite. **F:** Hematite and bornite. Bornite shows faint exsolution laminae of chalcopyrite. **G:** Bornite intergrown with chalcopyrite. Covellite fills small fissures crosscutting bornite. **H:** Bornite intergrown with chalcopyrite. Covellite grows along bornite rims. Bornite shows faint exsolutions of chalcopyrite. **A-H:** VALDD13-14\_1293. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; cv = covellite; hem = hematite.



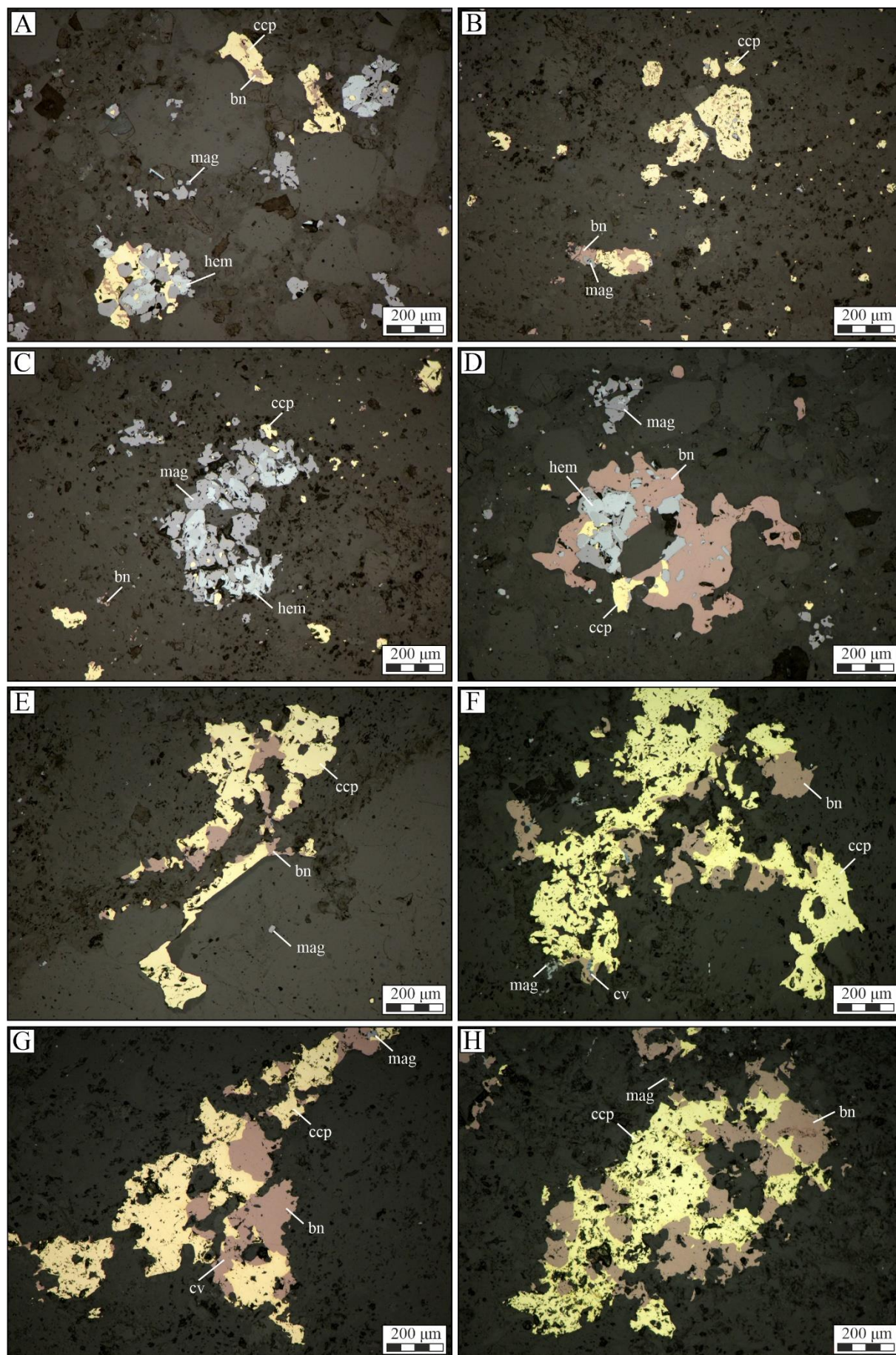
**Fig. A2-24.** **A:** Hematite overgrown by massive chalcopyrite. **B:** Hematite overgrown by massive chalcopyrite. **C:** Hematite intergrown with bornite and chalcopyrite. Bornite shows faint exsolution laminae of chalcopyrite. **D:** Bornite intergrown with chalcopyrite. Bornite shows faint exsolutions of chalcopyrite. **E:** Bornite intergrown with chalcopyrite and hematite. **F:** Hematite overgrown by massive bornite-chalcopyrite. **G:** Hematite overgrown by massive chalcopyrite. **H:** Hematite overgrown by massive chalcopyrite. **A-H:** VALDD13-14\_1360. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; hem = hematite.



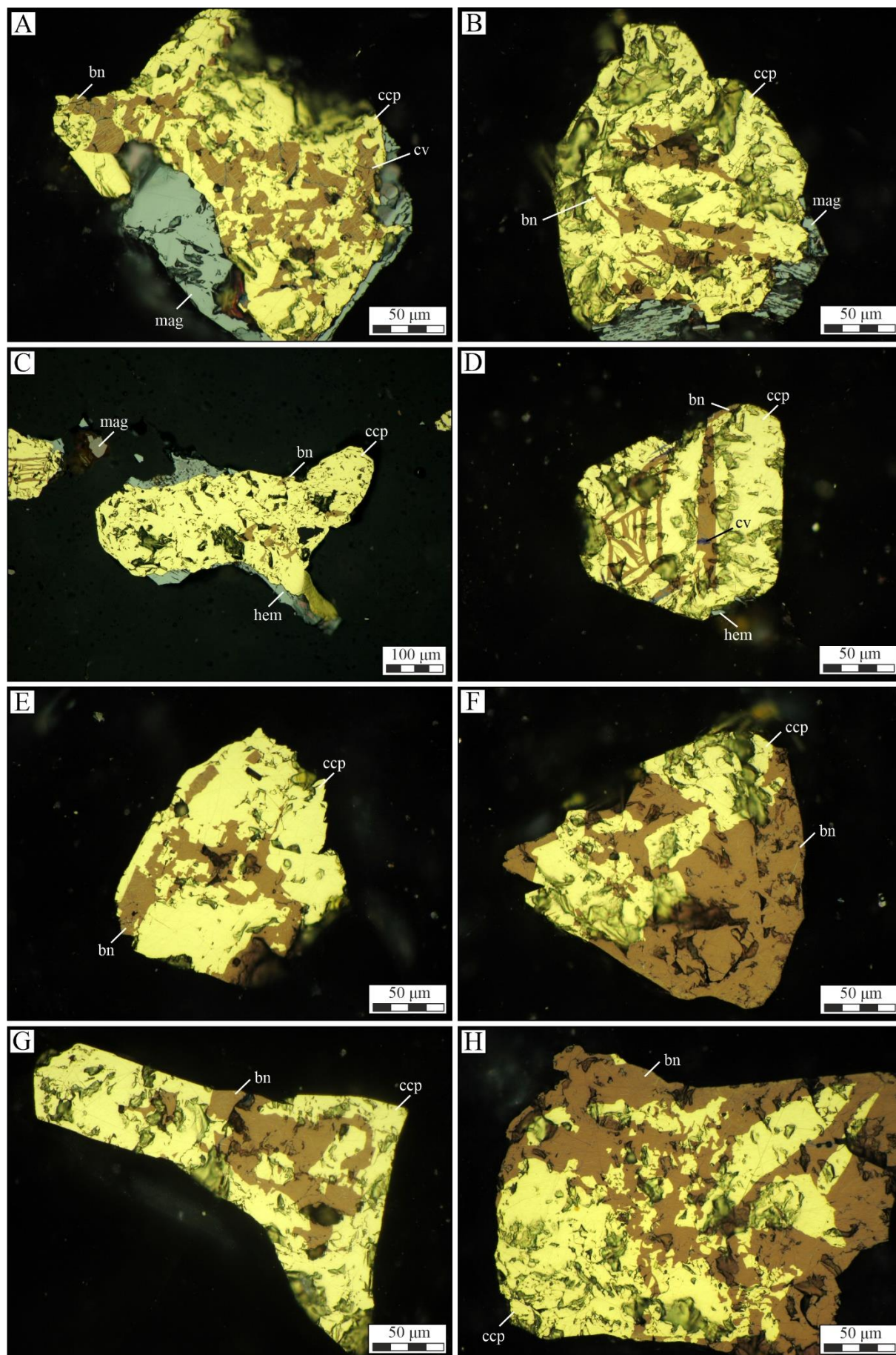
**Fig. A2-25.** **A:** Hematite laths overgrown by chalcopyrite. **B:** Hematite laths overgrown by chalcopyrite. Hematite contains remains of magnetite. Bornite-chalcopyrite grain sits in void of hematite laths. **C:** Hematite intergrown with magnetite and chalcopyrite. **D:** Hematite lath with magnetite remains. Chalcopyrite grain sits in a large void of hematite. **E:** Hematite lath with magnetite remains, overgrown by chalcopyrite. Bornite-chalcopyrite occur in voids of hematite. **F:** Hematite with magnetite remains, overgrown by chalcopyrite. Bornite-chalcopyrite grains sits in void of hematite. **G:** Hematite intergrown with magnetite. Small bornite and chalcopyrite inclusions occur in voids of hematite-magnetite. **H:** Hematite lath with remains of magnetite. **A-H:** VALDD13-14\_1466. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; hem = hematite.



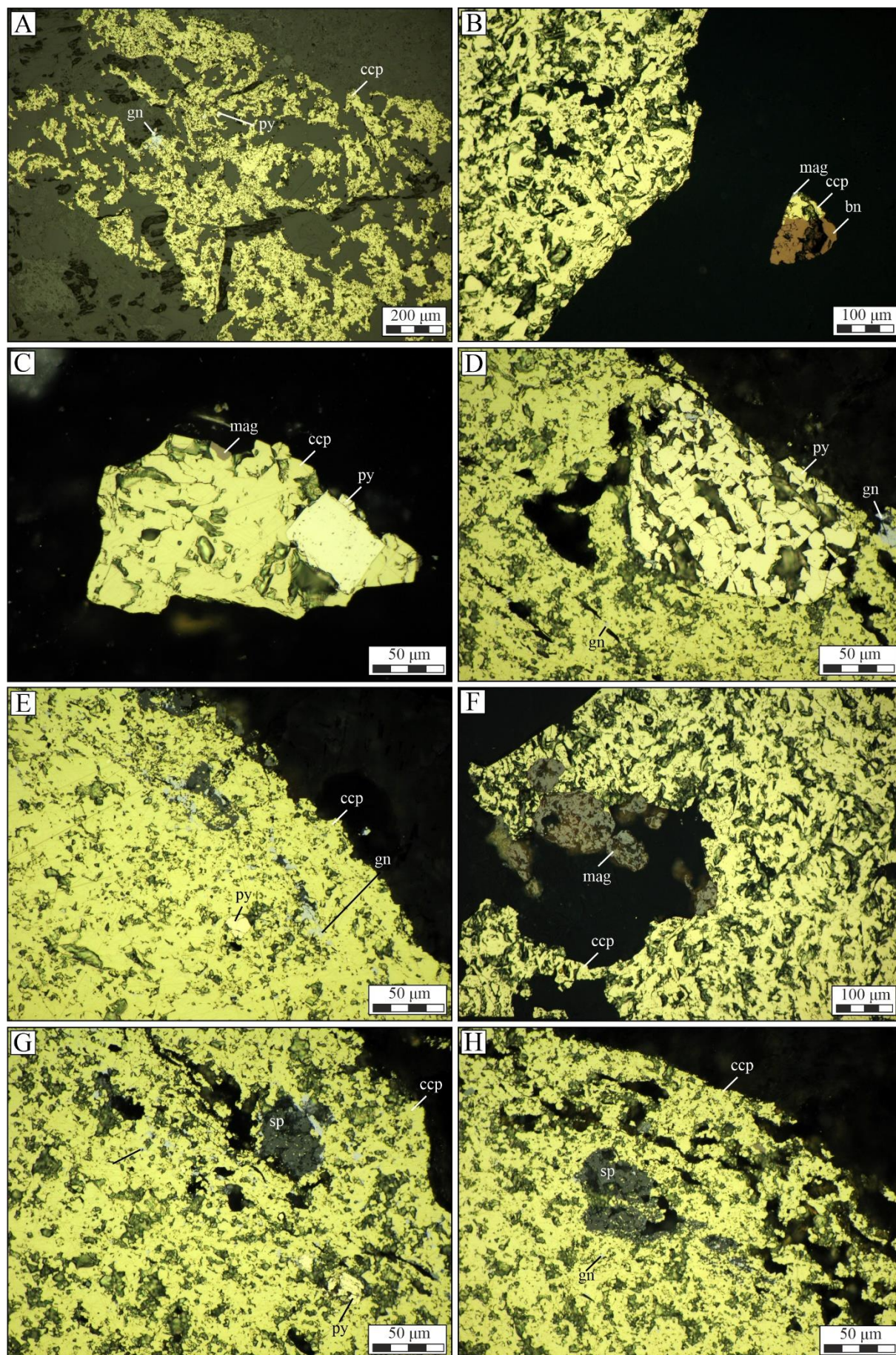
**Fig. A2-26.** **A-C:** Assemblage of hematite-magnetite-chalcopyrite-bornite. Hematite has largely replaced magnetite. **D:** Assemblage of hematite-magnetite-chalcopyrite-bornite-covellite. Hematite has largely replaced magnetite. **E:** Assemblage of hematite-magnetite-chalcopyrite. Hematite has largely replaced magnetite and encloses a zircon grain. **F:** Magnetite overgrown by bornite-chalcopyrite. **G:** Hematite with chalcopyrite-bornite-covellite. **H:** Hematite with bornite-chalcopyrite. Hematite surrounds and replaces magnetite. Small bornite-chalcopyrite inclusions sit in voids of hematite. **A-H:** VALDD13-14\_1523. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; cv = covellite; hem = hematite; mag = magnetite; zrn = zircon.



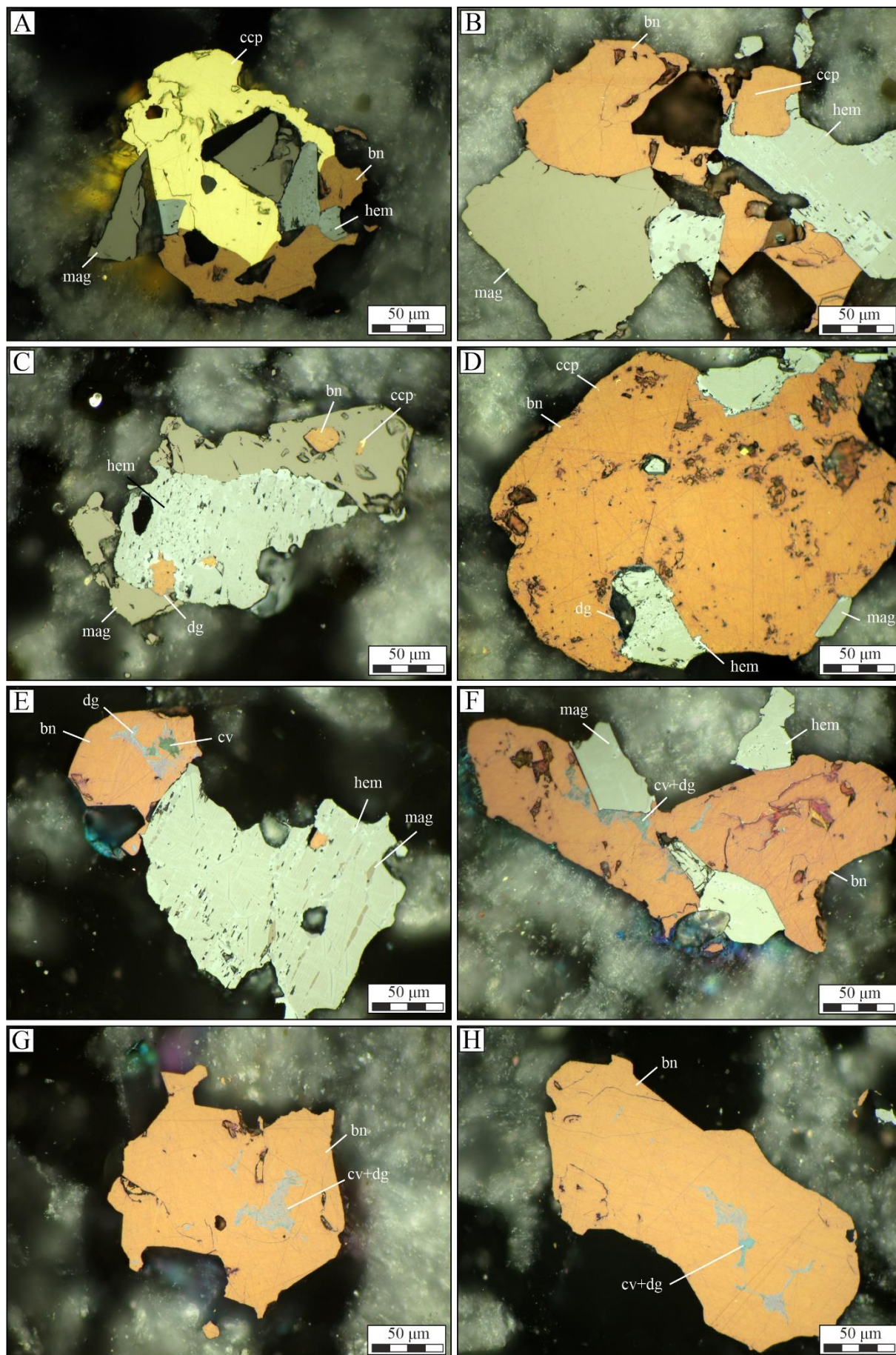
**Fig. A2-27.** **A:** Hematite-magnetite overgrown by bornite-chalcopyrite. **B:** Magnetite overgrown by bornite-chalcopyrite. **C:** Hematite-magnetite with bornite-chalcopyrite. Small chalcopyrite inclusions sit in voids of magnetite-hematite. **D:** Hematite-magnetite overgrown by bornite-chalcopyrite. **E:** Magnetite with bornite-chalcopyrite. **F:** Magnetite with bornite-chalcopyrite-covellite. **G:** Magnetite overgrown by bornite-chalcopyrite. Tiny fissure crosscutting bornite is filled with covellite. **H:** Bornite-chalcopyrite with hematite. **A-H:** VALDD13-14\_1576. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; cv = covellite; hem = hematite; mag = magnetite.



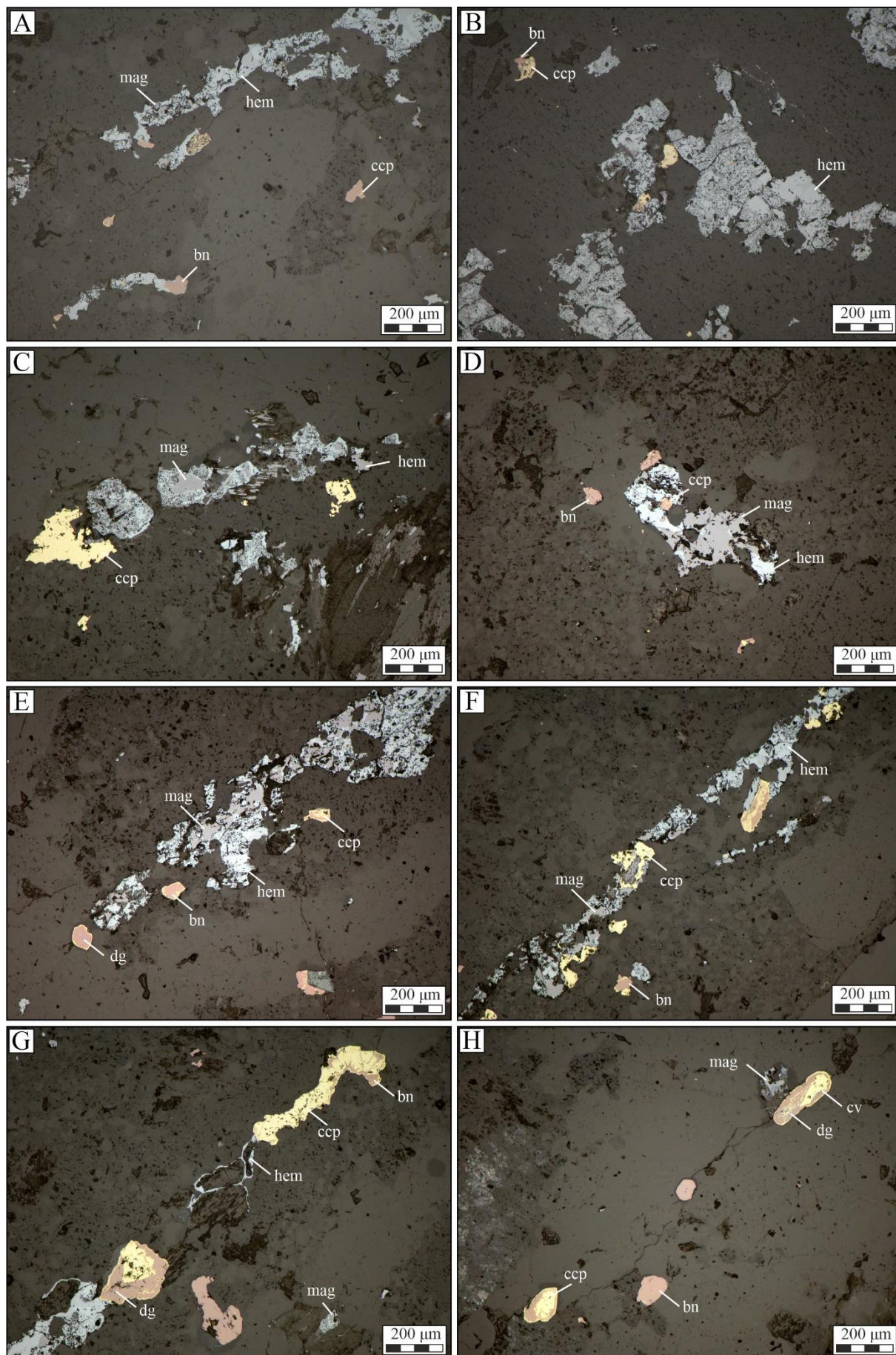
**Fig. A2-28.** **A:** Magnetite with bornite-chalcopyrite. Bornite shows chalcopyrite exsolution laminae and is cut by fissures filled with covellite. **B:** Magnetite with bornite-chalcopyrite. Bornite shows faint chalcopyrite exsolutions. **C:** Hematite-magnetite with bornite-chalcopyrite. Bornite shows faint exsolutions of chalcopyrite. **D:** Bornite-chalcopyrite-covellite with separate hematite crystals. **E:** Bornite-chalcopyrite. Bornite shows faint chalcopyrite exsolution laminae. **F:** Bornite-chalcopyrite. Bornite shows faint chalcopyrite exsolutions. **G:** Bornite-chalcopyrite. Bornite shows faint chalcopyrite exsolutions. **H:** Bornite-chalcopyrite. Bornite shows faint chalcopyrite exsolutions. **A-H:** VALDD13-14\_1633. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; cv = covellite; hem = hematite; mag = magnetite.



**Fig. A2-29.** **A:** Pyrite and galena overgrown by chalcopyrite. **B:** Bornite with chalcopyrite and magnetite. **C:** Pyrite overgrown by chalcopyrite with magnetite. **D:** Pyrite and galena overgrown by chalcopyrite. **E:** Pyrite and galena overgrown by chalcopyrite. **F:** Chalcopyrite with magnetite. **G:** Pyrite, galena and sphalerite overgrown by chalcopyrite. Sphalerite has tiny chalcopyrite inclusions. **H:** Galena and sphalerite overgrown by chalcopyrite. **A-H:** VALDD13-14\_1676. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; gn = galena; mag = magnetite; py = pyrite; sp = sphalerite.



**Fig. A2-30.** **A:** Hematite and magnetite with bornite and chalcopyrite. Hematite is likely after ilmenite. Bornite shows faint exsolutions of chalcopyrite. **B:** Hematite and magnetite with bornite. Hematite is likely after ilmenite. Bornite shows faint exsolutions of chalcopyrite. **C:** Hematite with magnetite. Hematite is likely after ilmenite. Hematite and magnetite enclose bornite-chalcopyrite-digenite. **D:** Hematite with bornite-digenite. Bornite contains small chalcopyrite inclusions. **E:** Hematite with remains of magnetite. Digenite and covellite in bornite. **F:** Magnetite-hematite overgrown by bornite-digenite-covellite. **G:** Bornite with digenite-covellite. **H:** Bornite with digenite-covellite. **A-H:** VALDD13-14\_1755. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; cv = covellite; dg = digenite; hem = hematite; mag = magnetite.



**Fig. A2-31.** **A:** Hematite-magnetite with bornite-chalcopyrite. **B:** Hematite with bornite-chalcopyrite. **C:** Hematite-magnetite with chalcopyrite. **D:** Hematite-magnetite with bornite-chalcopyrite. **E:** Hematite-magnetite with bornite-chalcopyrite-digenite. **F:** Hematite-magnetite with bornite-chalcopyrite. **G:** Hematite-magnetite with bornite-chalcopyrite-digenite. **H:** Magnetite with bornite-chalcopyrite-covellite-digenite. **A-H:** VALDD13-14\_1828. All photomicrographs are taken in oil. Abbreviations: bn = bornite; ccp = chalcopyrite; cv = covellite; dg = digenite; hem = hematite; mag = magnetite.