⑮NAK-4-ロ-2
鍛造剥片
0.18mm厚み　磁着強

①×3　外観写真
②×20　マクロ組織
③×400　王水etch

⑯NAK-4-ロ-3
鍛造剥片
0.10mm厚み　磁着強

④×3　外観写真
⑤×20　マクロ組織
⑥×400　no etch
⑦×100　⑧×400 王水etch

⑰NAK-4-ロ-4
鍛造剥片
0.04mm厚み　磁着強

⑨×3　外観写真
⑩×20　マクロ組織
⑪×400　no etch
⑫×100　⑬×400 王水etch

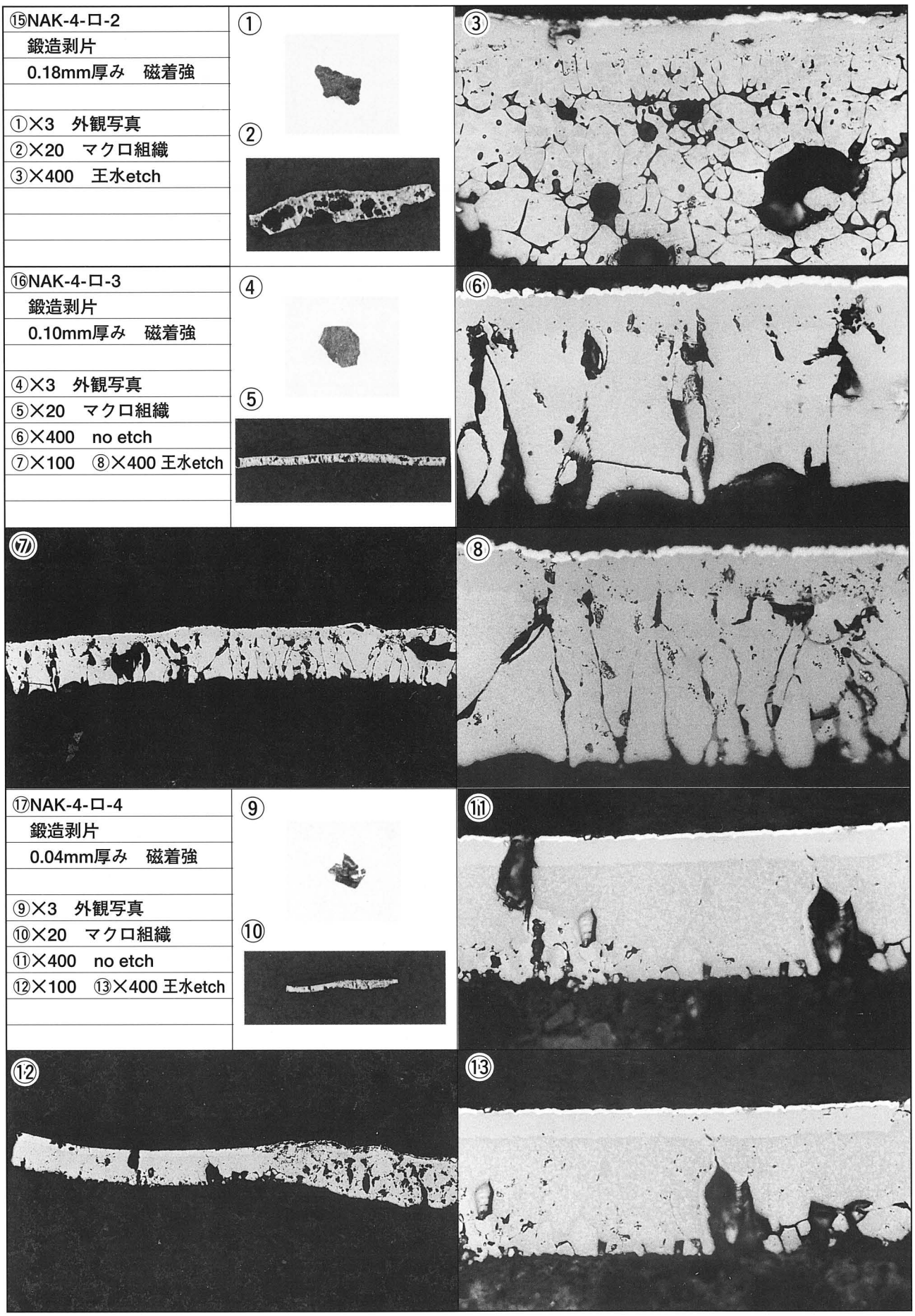
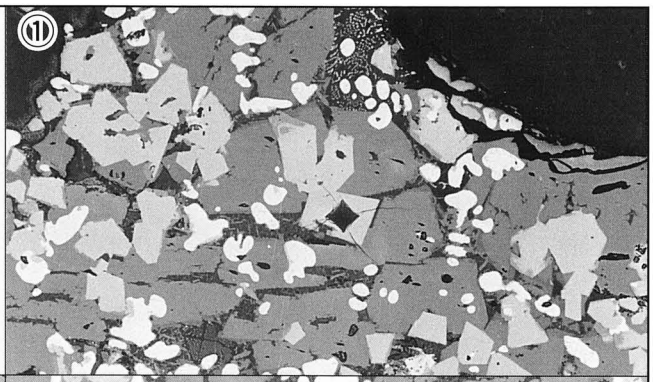
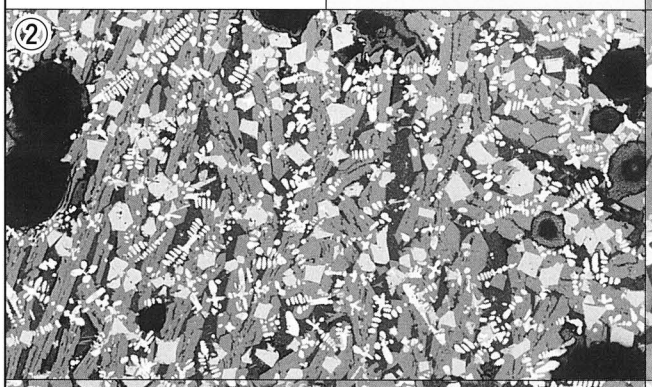


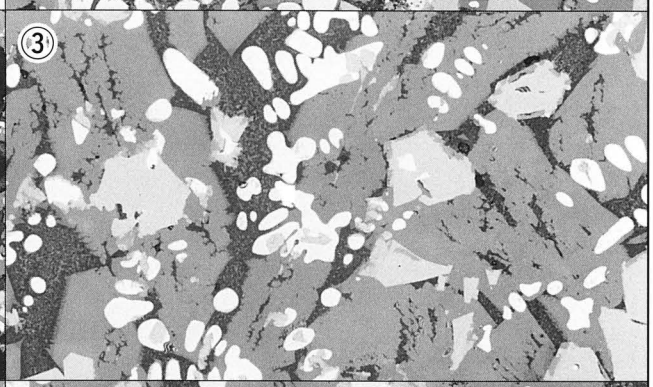

Photo.7　鍛造剥片の顕微鏡組織

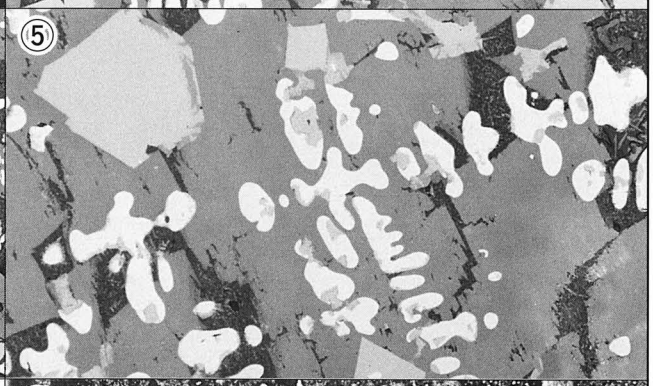
⑱NAK-5
椀形鍛冶滓
（精錬鍛冶滓）

①×200　硬度圧痕　200g
ウルボスピネル：670Hv
②④×100　③⑤×400
ヴスタイト（Fe-Ti析出物含）
＋ウルボスピネル



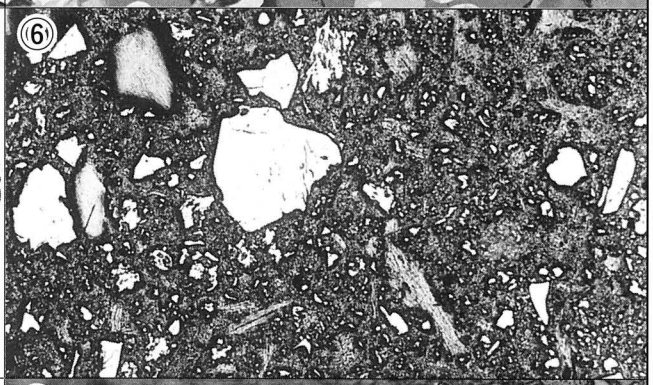



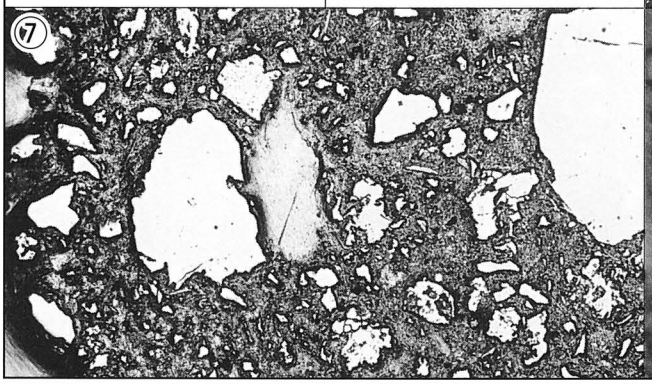






⑲NAK-6
羽口胎土

⑥×50　⑦×100　⑧×400
粘土鉱物（セリナイト）
＋石英



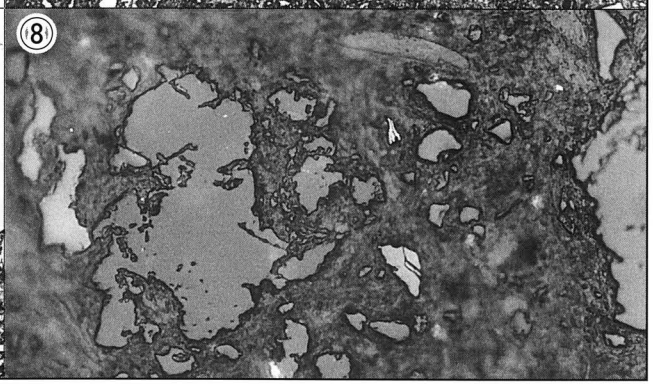
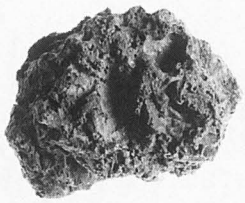
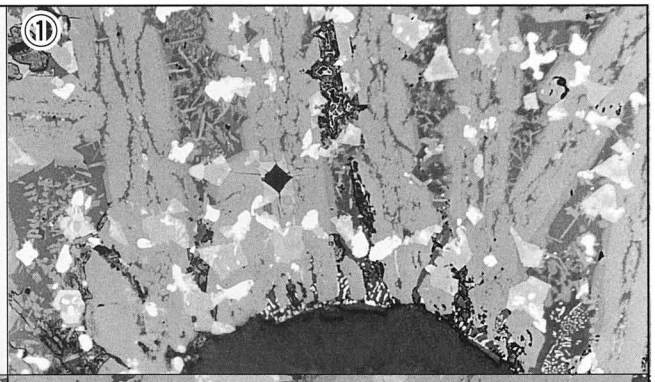



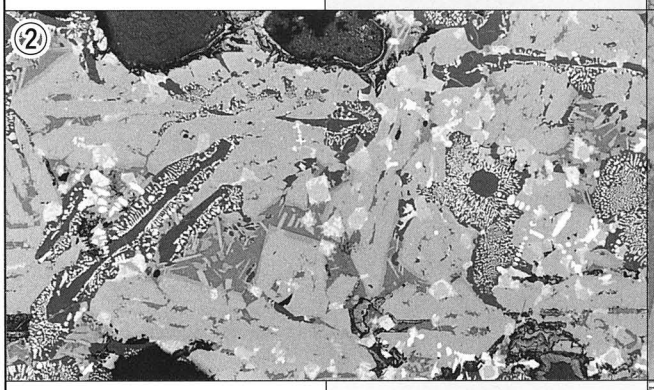

Photo.8　鉄滓と羽口胎土の顕微鏡組織

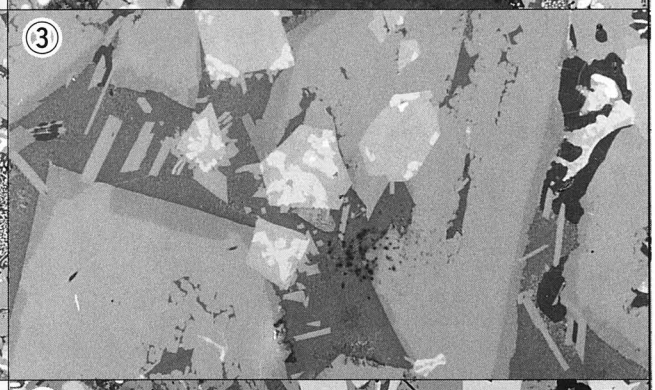
⑳NAK-7
精錬鍛冶滓

①×200　硬度圧痕
ヘーシナイト：876Hv
②×100　③×400
ヘーシナイト＋ヴスタイト
＋ファイヤライト



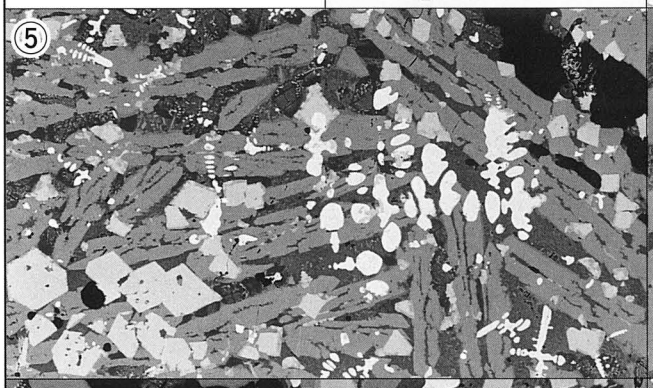


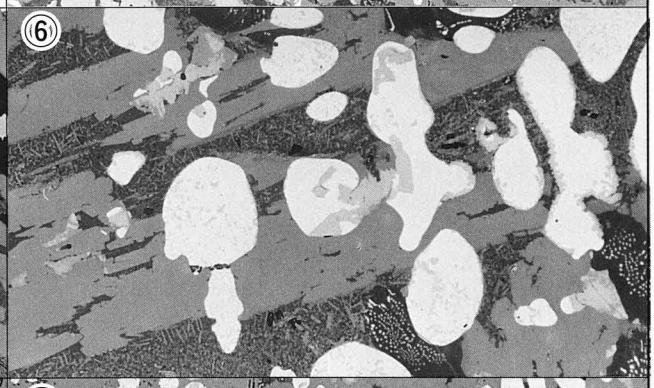



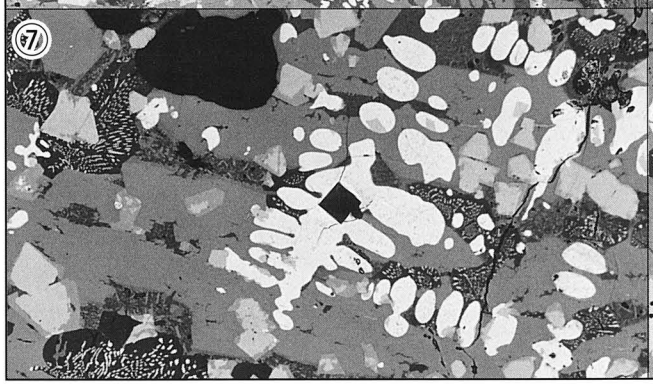




㉑NAK-11
精錬鍛冶滓

④⑤×100　⑥×400
ヴスタイト(Fe-Ti析出物)
＋ウルボスピネル＋ファイヤライト
⑦⑧×200　硬度圧痕200g
⑦：ヴスタイト：437Hv
⑧：ヴルボスピネル：611Hv



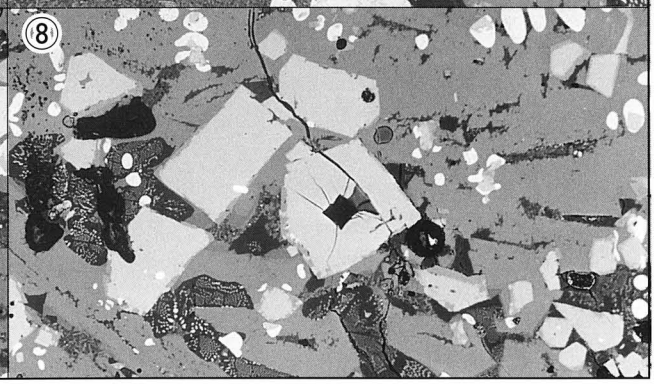




Photo.9　鉄滓の顕微鏡組織

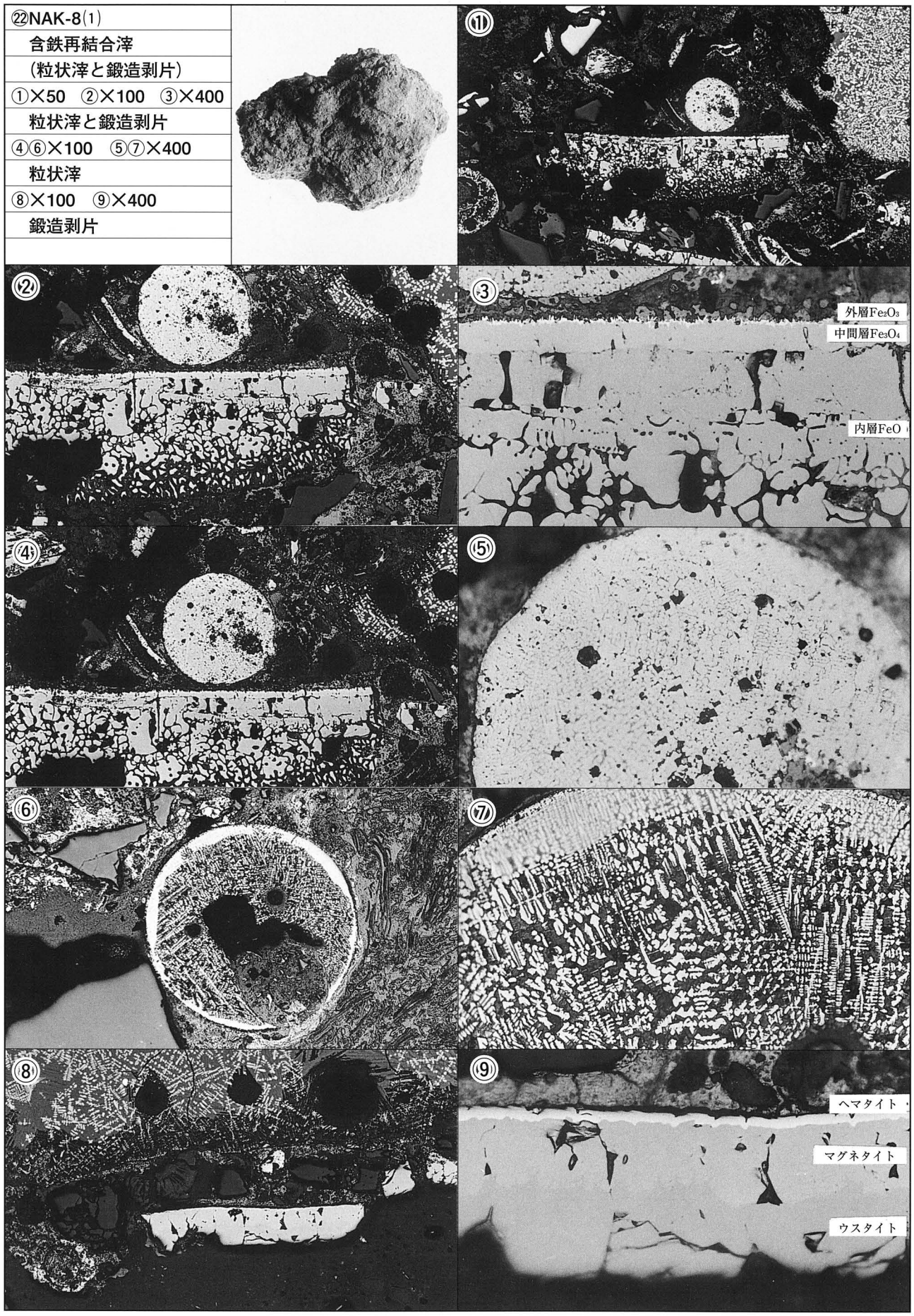



Photo.10　含鉄再結合滓の顕微鏡組織（粒状滓と鍛造剥片）

㉓NAK-8(2)

再結合滓含鉄部分

①×100　過共析鋼と白鋳鉄

②×100　③④×400

亜共晶組成　白鋳鉄

⑤～⑨×200　硬度圧痕

⑤パーライト：356Hv　⑥レデブライト：573：Hv　⑦パーライト：253Hv

⑧セメンタイト：770Hv　⑨過共析鋼パーライト：563Hv



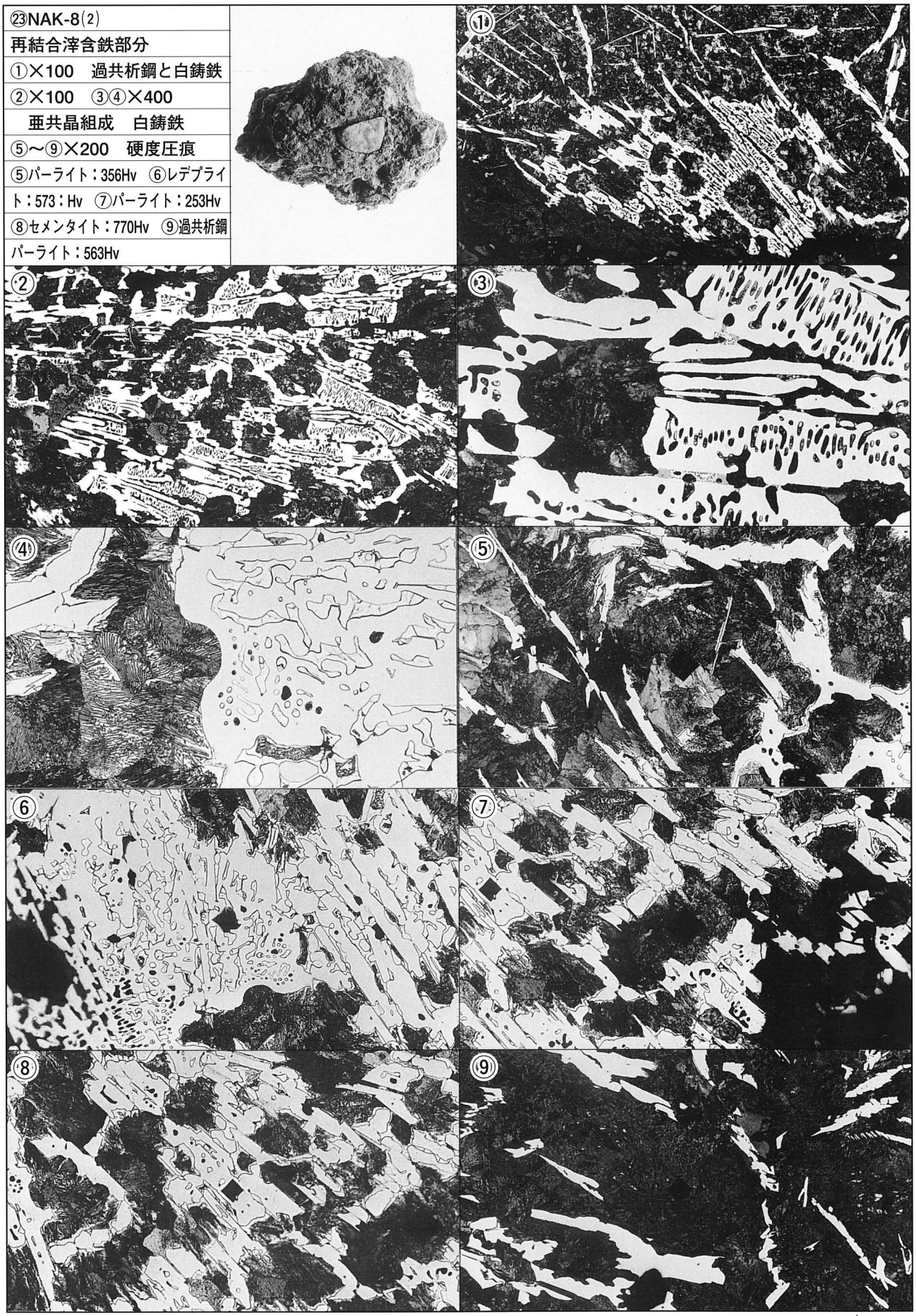
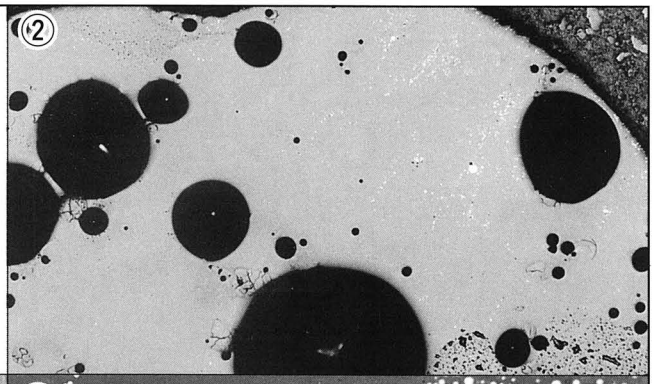
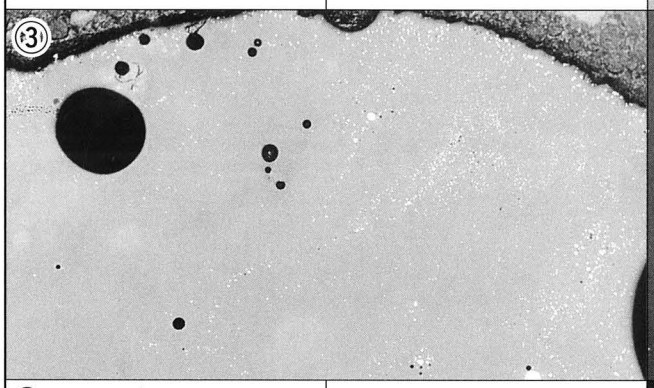



Photo.11　含鉄再結合滓の顕微鏡組織（含鉄部分）

㉔NAK-9-イ-1
粒状滓
3.4mm径、磁着弱

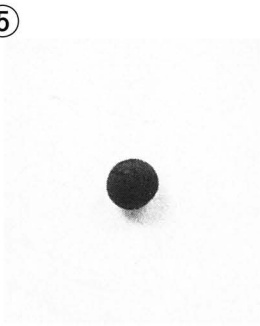
①×3　外観写真
⑨×20　マクロ組織（0.79）
②×50　③×100　④×400
ガラス質スラグ

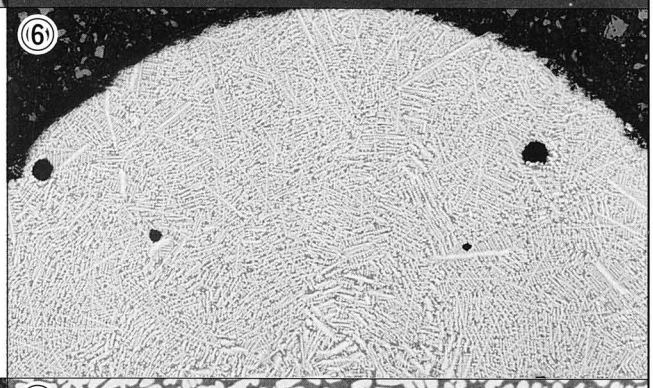


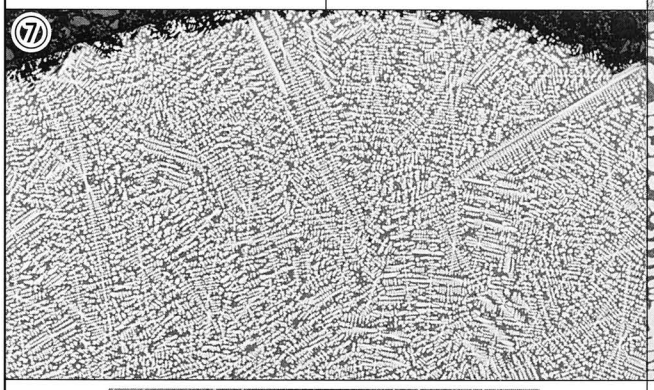



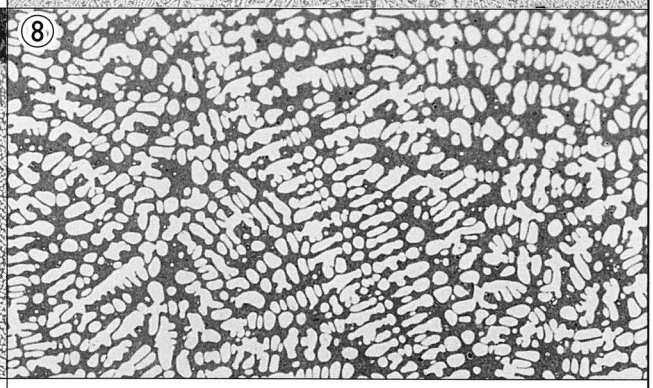
㉕NAK-9-イ-2
粒状滓
2.3mm径、磁着弱

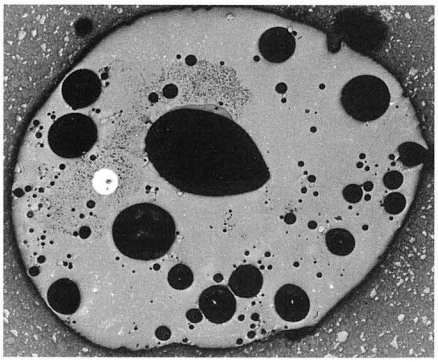
⑤×3　外観写真
⑩×20　マクロ組織（0.96）
⑥×50　⑦×100　⑧×400
微小ヴスタイト



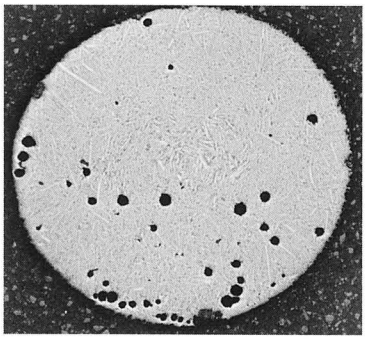
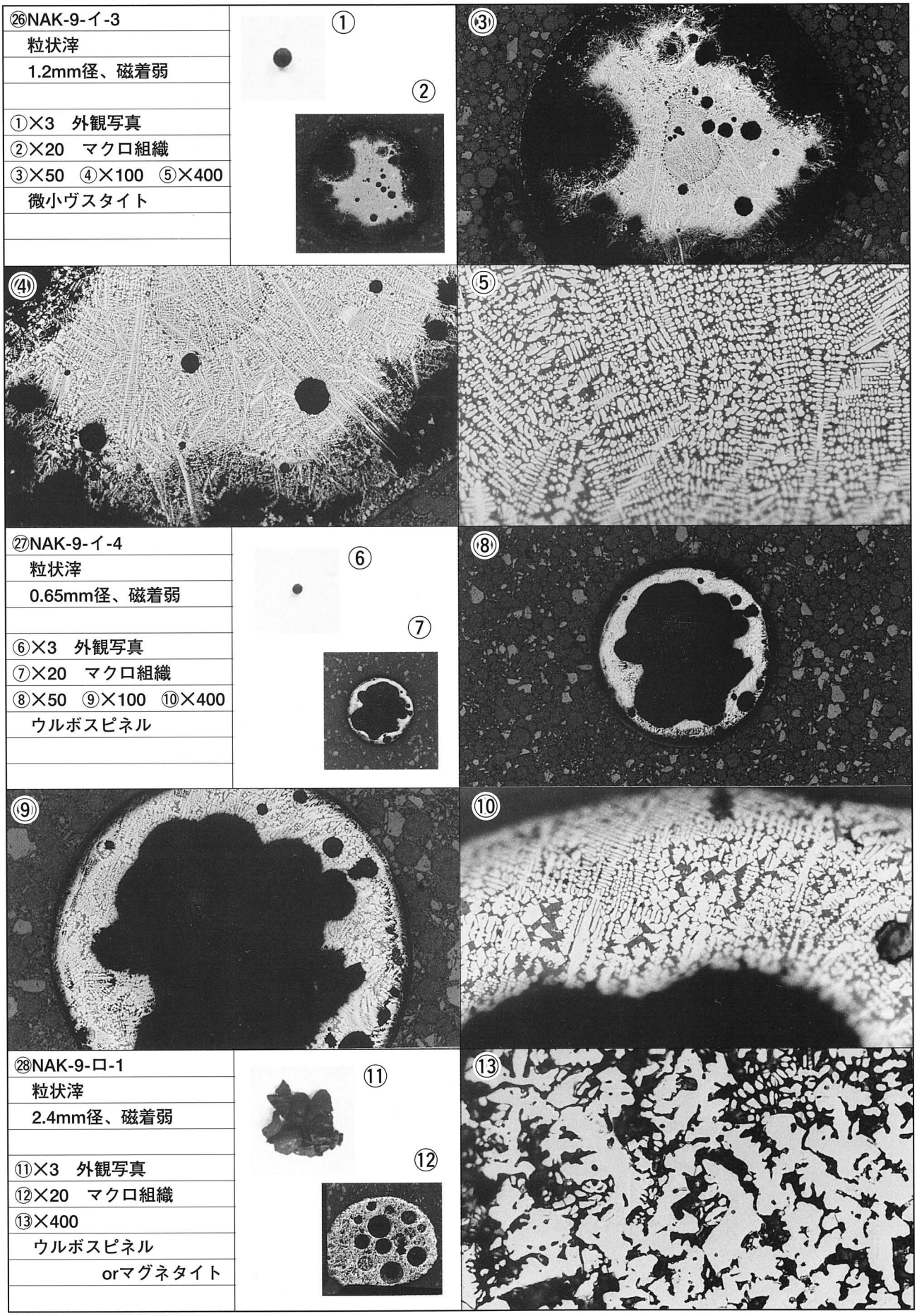




Photo.12　粒状滓の顕微鏡組織

㉖NAK-9-イ-3
粒状滓
1.2mm径、磁着弱

①×3　外観写真
②×20　マクロ組織
③×50　④×100　⑤×400
微小ヴスタイト




㉗NAK-9-イ-4
粒状滓
0.65mm径、磁着弱

⑥×3　外観写真
⑦×20　マクロ組織
⑧×50　⑨×100　⑩×400
ウルボスピネル

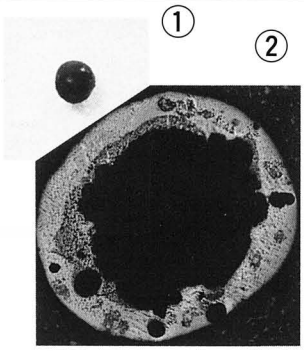
㉘NAK-9-ロ-1
粒状滓
2.4mm径、磁着弱

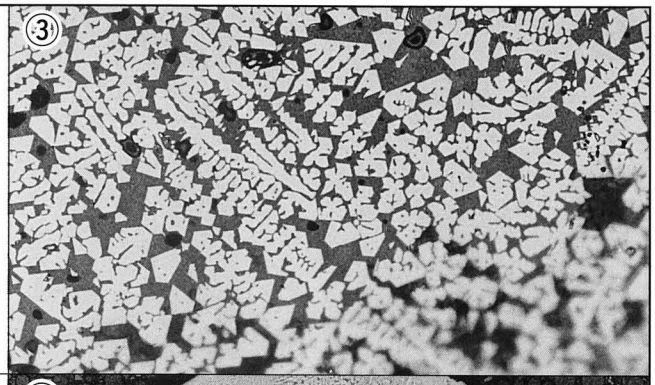
⑪×3　外観写真
⑫×20　マクロ組織
⑬×400
ウルボスピネル
orマグネタイト

Photo.13　粒状滓の顕微鏡組織

㉙NAK-9-ロ-2
粒状滓
1.4mm径、磁着弱

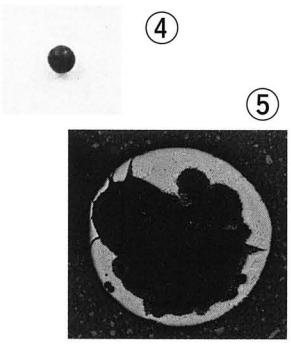
①×3　外観写真
②×20　マクロ組織
③×400
ウルボスピネル
orマグネタイト

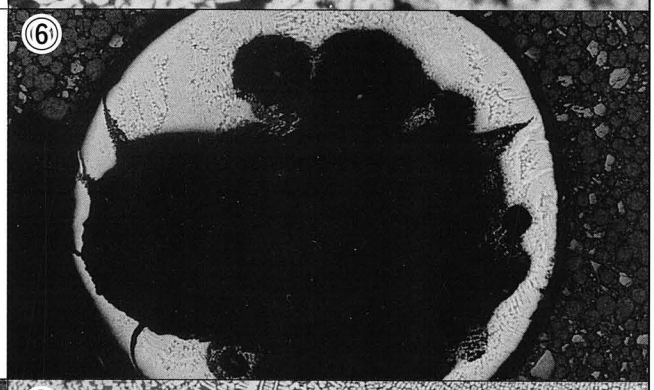


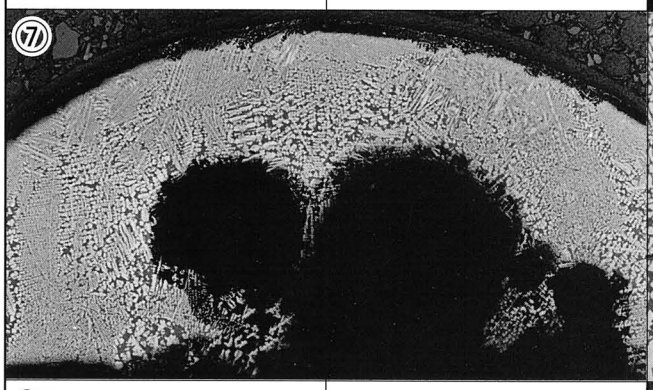



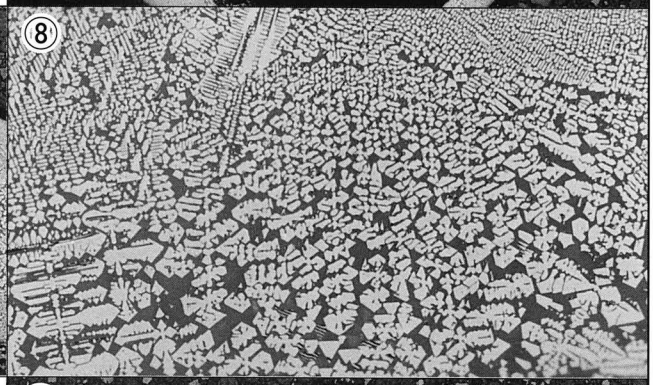

㉚NAK-9-ロ-3
粒状滓

④×3　外観写真
⑤×20　マクロ組織
⑥×50　⑦×100　⑧×400
ウルボスピネル
orマグネタイト

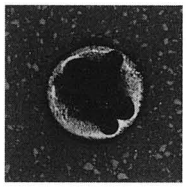


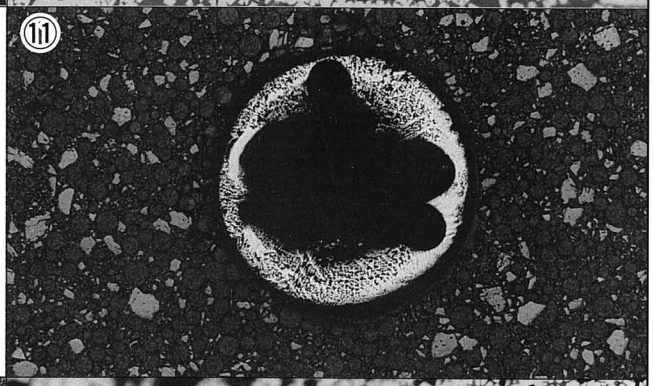



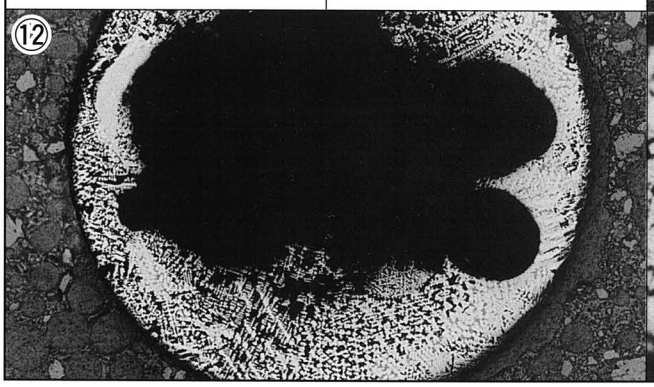




㉛NAK-9-ロ-4
粒状滓
0.5mm径、磁着弱
⑨×3　外観写真
⑩×20　マクロ組織
⑪×50　⑫×100　⑬×400
ウルボスピネル
orマグネタイト



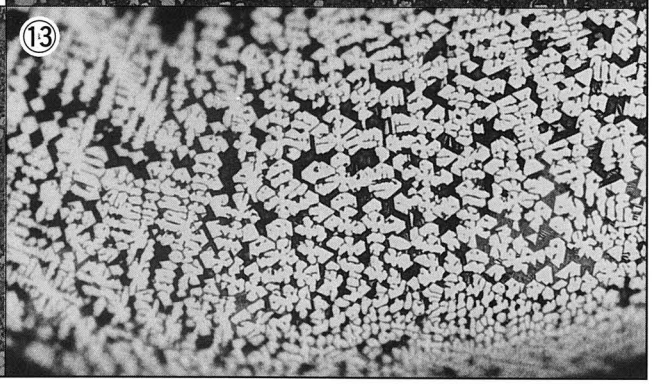



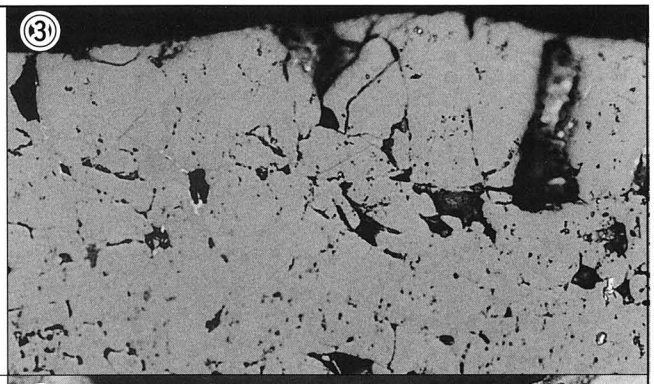

Photo.14　粒状滓の顕微鏡組織

㉜NAK-10-イ-1
鍛造剥片
0.18mm厚み　磁着強

①×3　外観写真
②×20　マクロ組織
③×400　王水etch
3層不鮮明

①

②

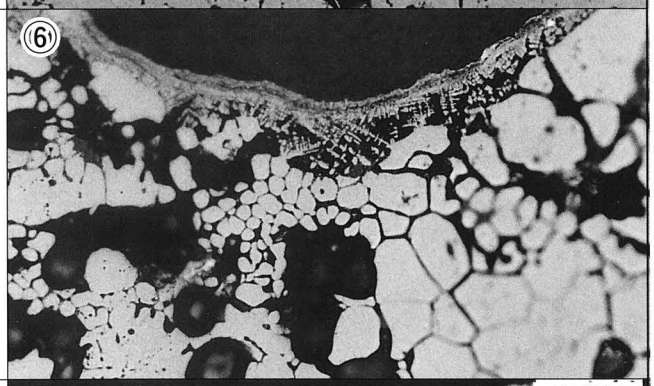

③

㉝NAK-10-イ-2
鍛造剥片
0.16mm厚み　磁着強

④×3　外観写真
⑤×20　マクロ組織
⑥×400　王水etch
内層ヴスタイト粒状

④

⑤

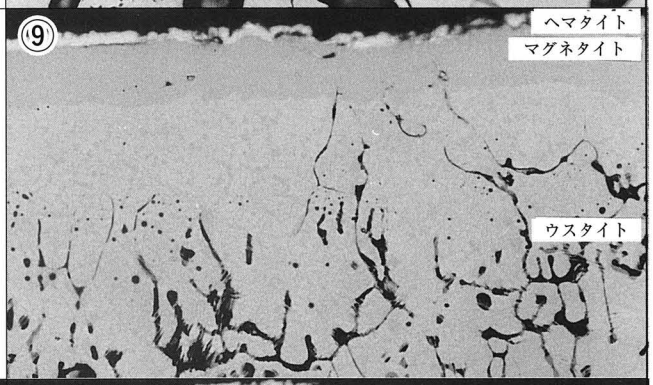

⑥

㉞NAK-10-イ-3
鍛造剥片
0.10mm厚み　磁着弱

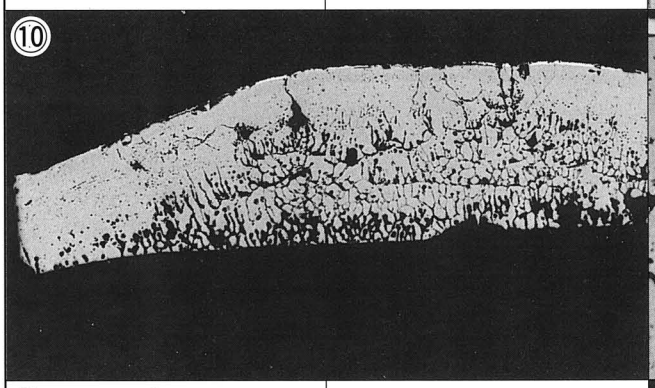
⑦×3　外観写真
⑧×20　マクロ組織
⑨×400　no etch
⑩×100　⑪×400 王水etch
内層ヴスタイト粒状

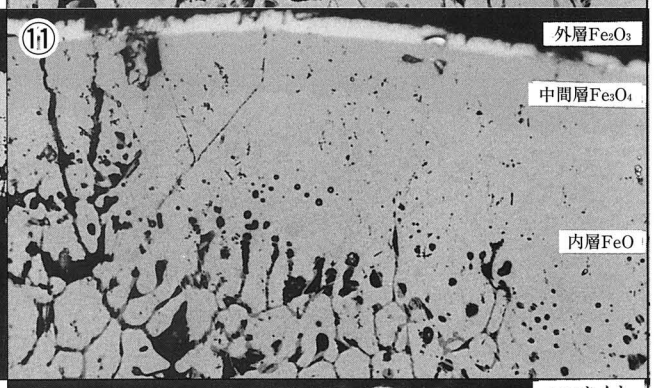
⑦

⑧



⑨


⑩



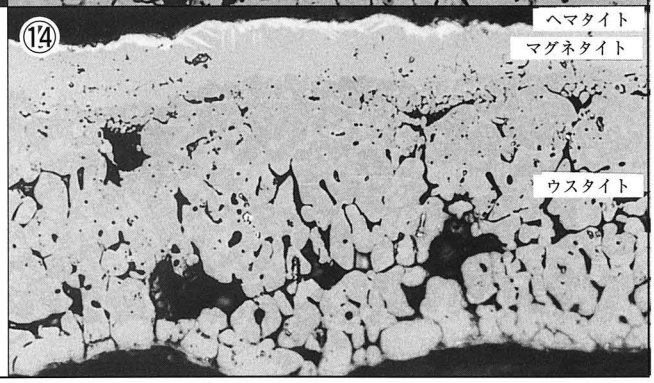
⑪

㉟NAK-10-イ-4
鍛造剥片
0.04mm厚み　磁着弱

⑫×3　外観写真
⑬×20　マクロ組織
⑭×400　王水etch
内層ヴスタイト粒状

⑫

⑬

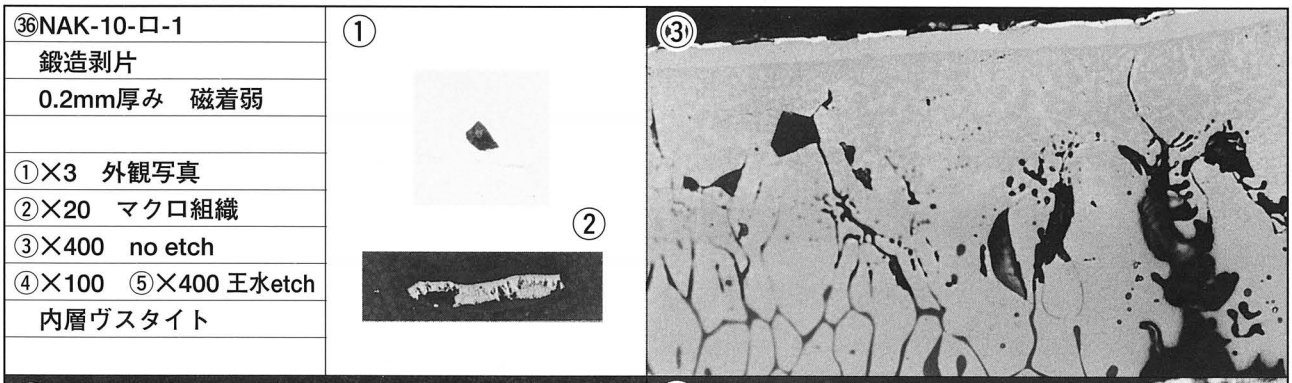


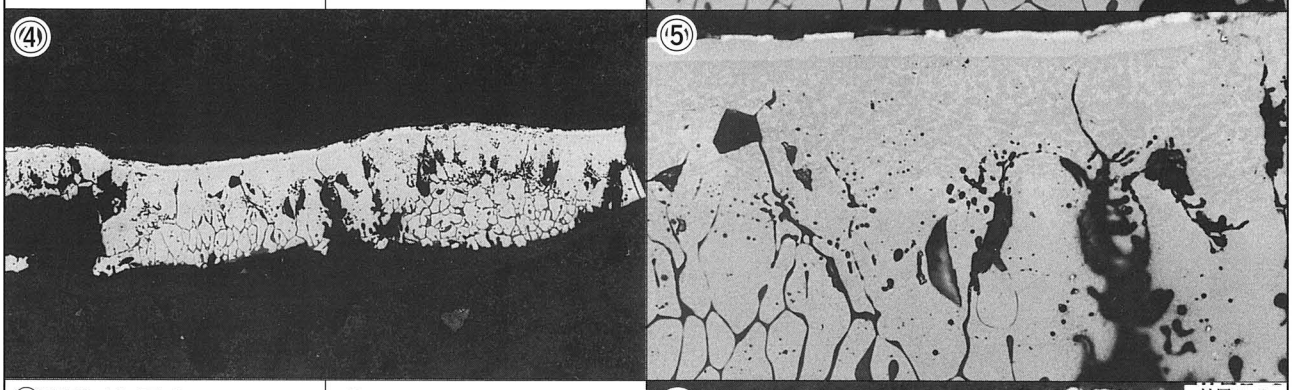
⑭

Photo.15　鍛造剥片の顕微鏡組織

㊱NAK-10-ロ-1
鍛造剥片
0.2mm厚み　磁着弱

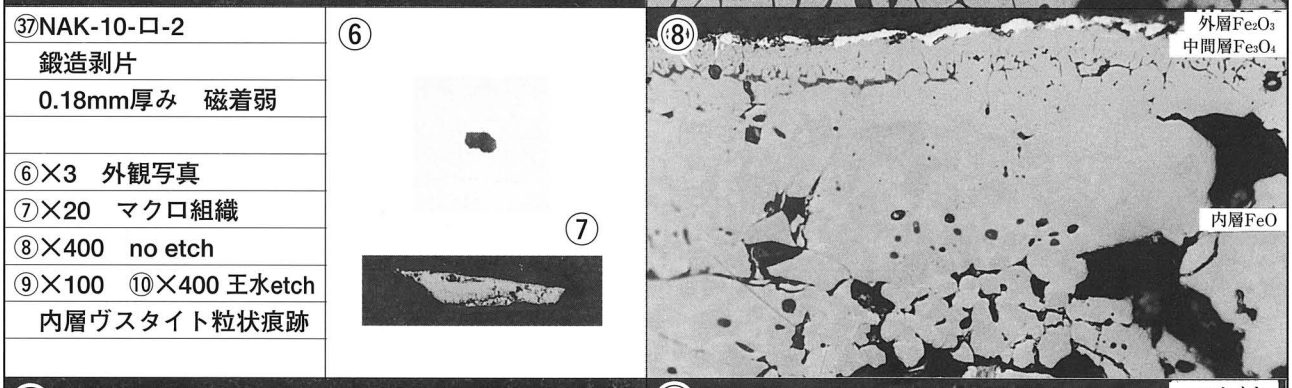
①×3　外観写真
②×20　マクロ組織
③×400　no etch
④×100　⑤×400 王水etch
内層ヴスタイト

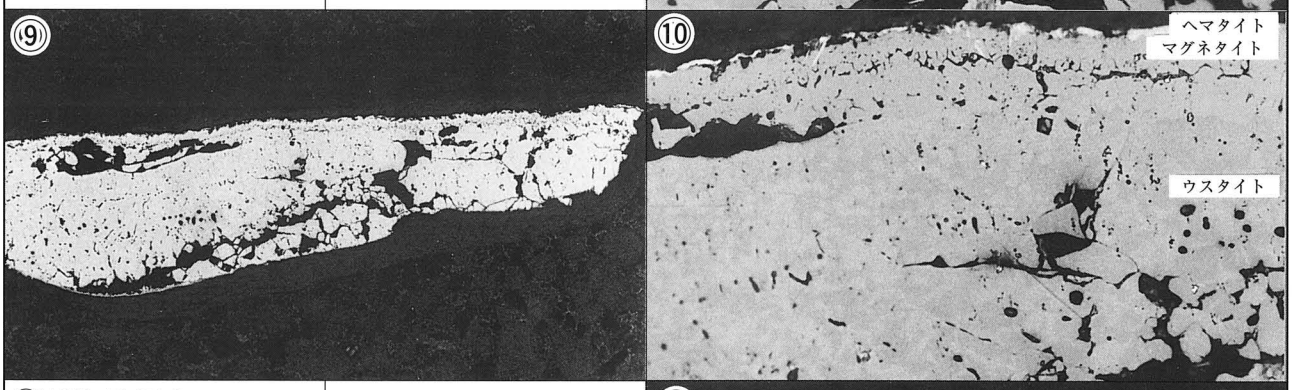



㊲NAK-10-ロ-2
鍛造剥片
0.18mm厚み　磁着弱

⑥×3　外観写真
⑦×20　マクロ組織
⑧×400　no etch
⑨×100　⑩×400 王水etch
内層ヴスタイト粒状痕跡




㊳NAK-10-ロ-3
鍛造剥片
0.17mm厚み　磁着弱

⑪×3　外観写真
⑫×20　マクロ組織
⑬×400　王水etch
内層ヴスタイト粒状

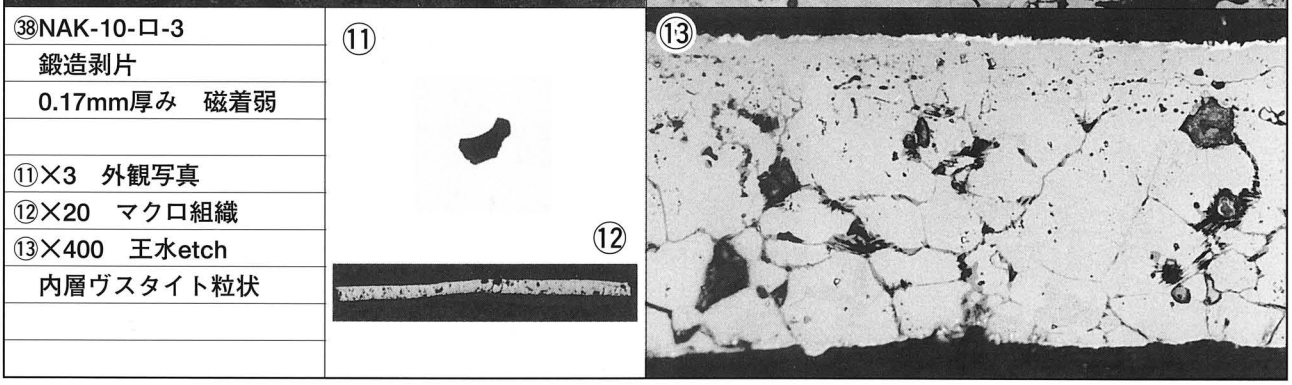
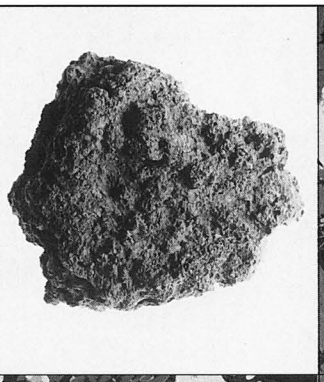
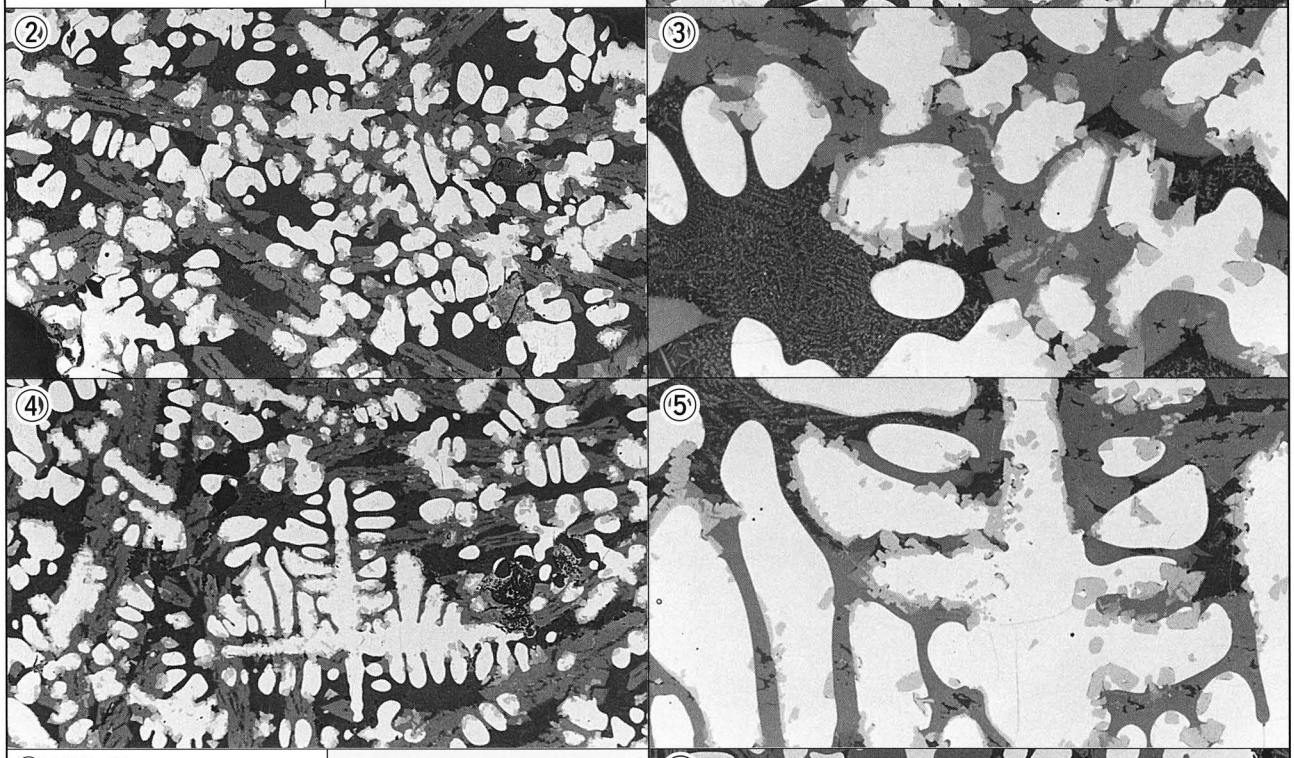



**Photo.16　鍛造剥片の顕微鏡組織**

㊴NAK-12
椀形鍛冶滓
(精錬鍛冶滓)

②×200　硬度圧痕　200g
ヴスタイト：515Hv
②④×100　③⑤×400
ヴスタイト(粒内Fe-Ti析出)






㊵NAK-15
椀形鍛冶滓
(精錬鍛冶滓)

⑥×200　硬度圧痕　200g
ヴスタイト：507Hv
⑦×100　⑧×400
ヴスタイト＋ファイヤライト



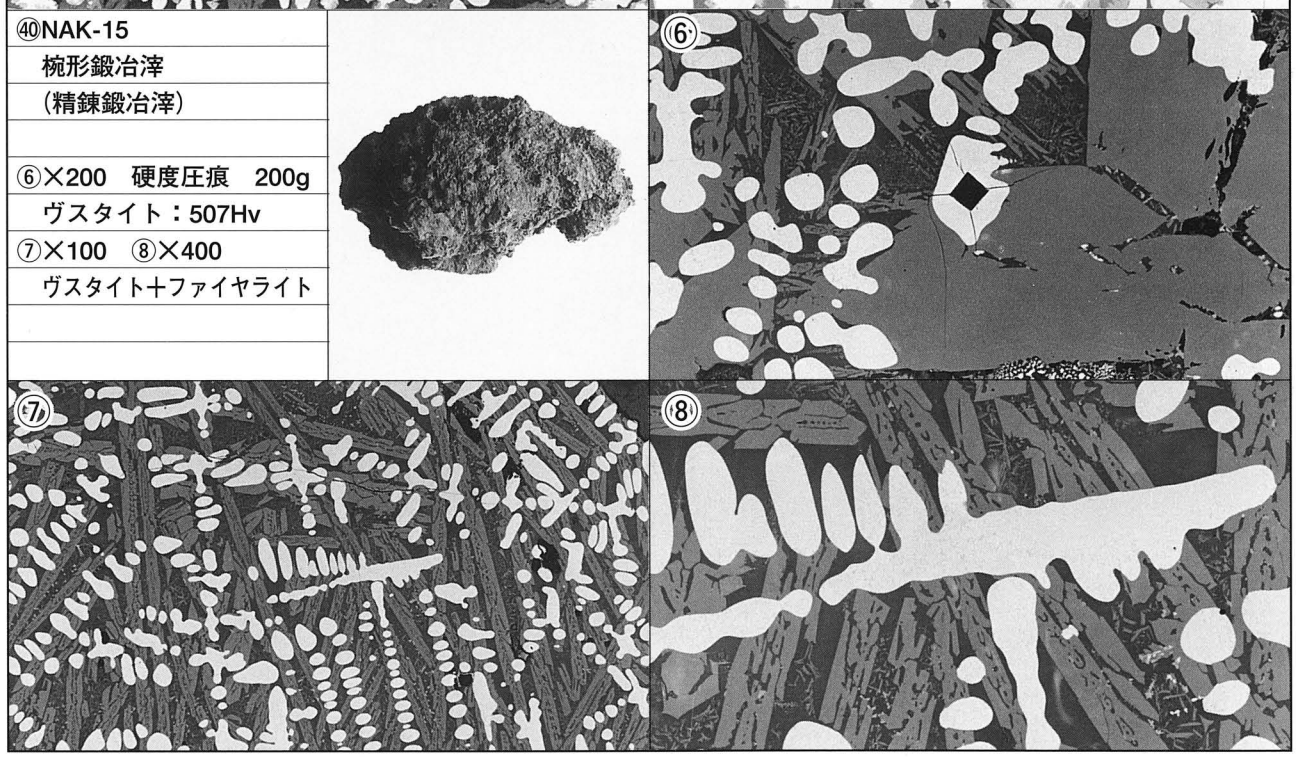
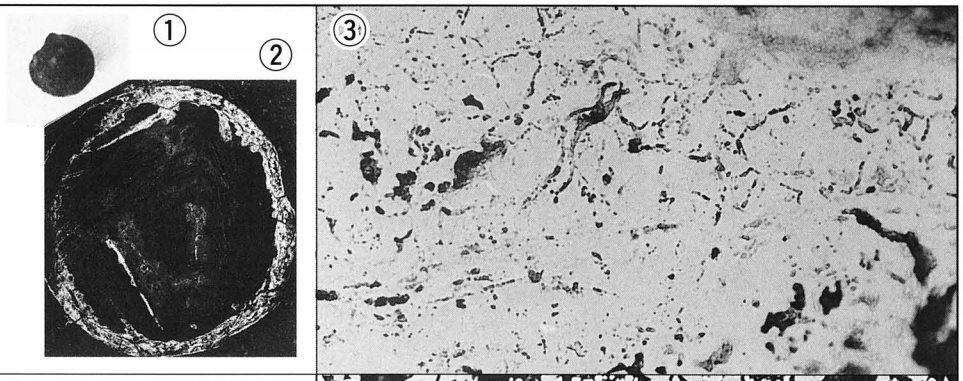


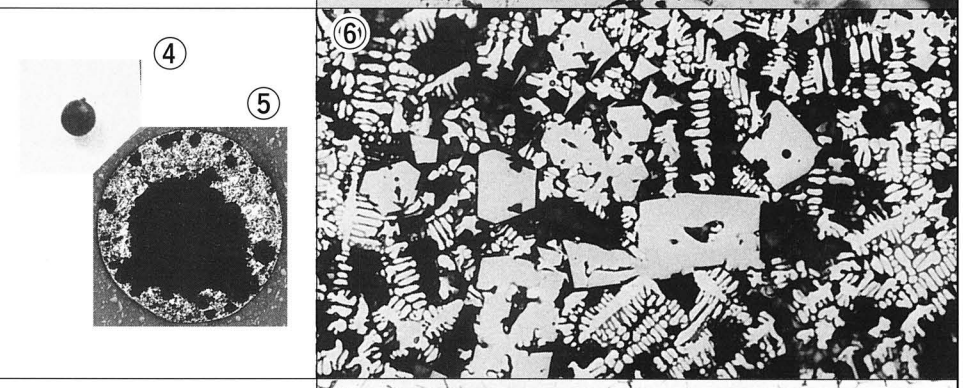

Photo.17　鉄滓の顕微鏡組織

㊶NAK-13-イ-1
疑似粒状滓
3.1mm径、磁着強

①×3　外観写真
②×20　マクロ組織
鉄粒(フェライト結晶痕跡)
③×400
ゲーサイト：(α-FeO・OH)

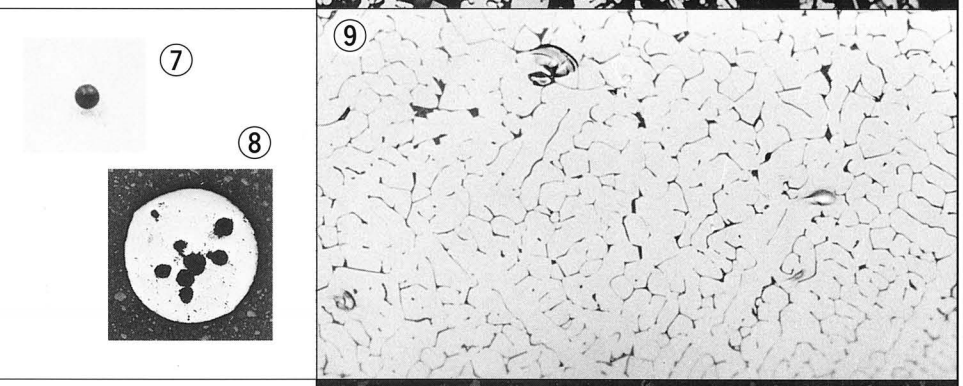



㊷NAK-13-イ-2
粒状滓
1.6mm径　磁着強
④×3　外観写真
⑤×20　マクロ組織
⑥×400
ウルボスピネル+ヴスタイト



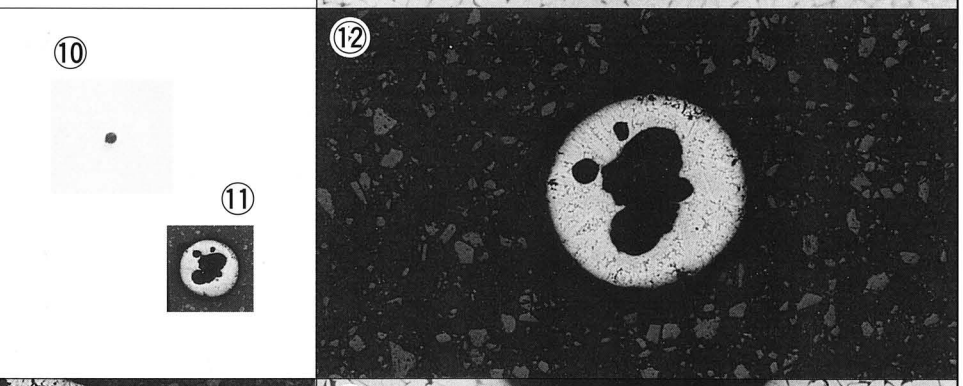

㊸NAK-13-イ-3
粒状滓
1.2mm径、磁着強

⑦×3　外観写真
⑧×20　マクロ組織
⑨×400
ヴスタイト・凝集




㊹NAK-13-イ-4
粒状滓
0.4mm径　磁着強

⑩×3　外観写真
⑪×20　マクロ組織
⑫×50　⑬×100　⑭×400
ウルボスピネル
orマグネタイト？



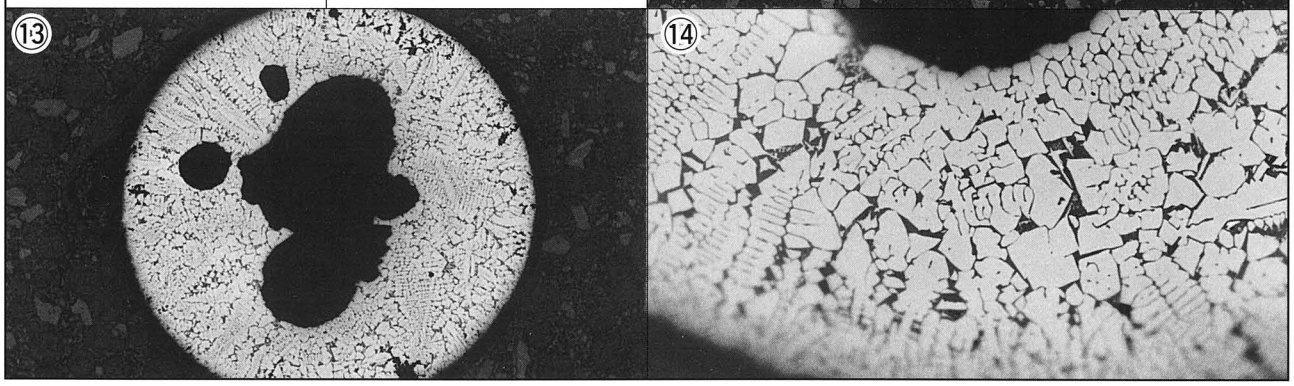
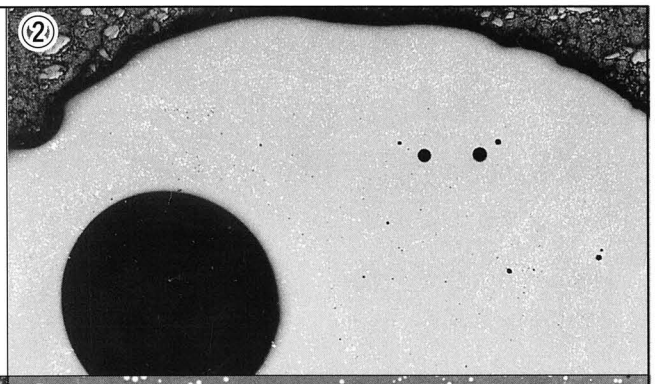
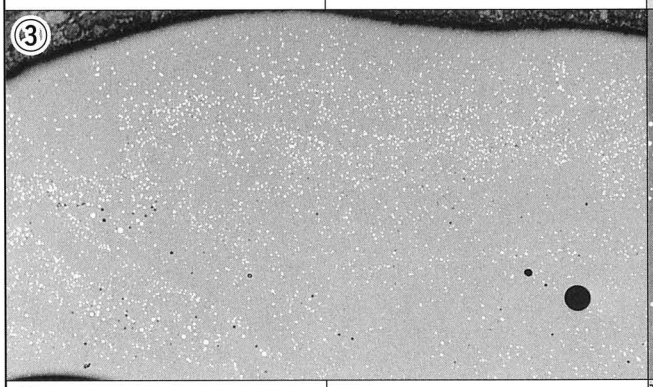



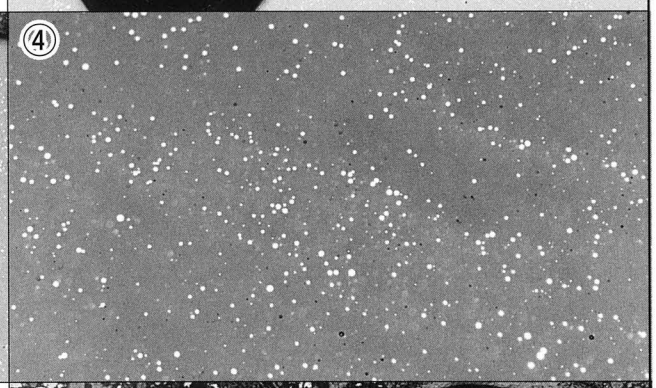

Photo.18　粒状滓の顕微鏡組織

㊺NAK-13-ロ-1
粒状滓
3.6mm径、磁着弱

①×3　外観写真
⑨×20　マクロ組織（0.84）
②×50　③×100　④×400
暗黒色ガラス質スラグ中
の金属鉄・微粒子

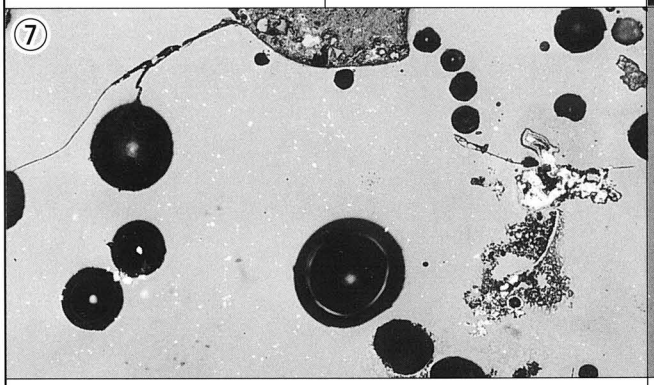


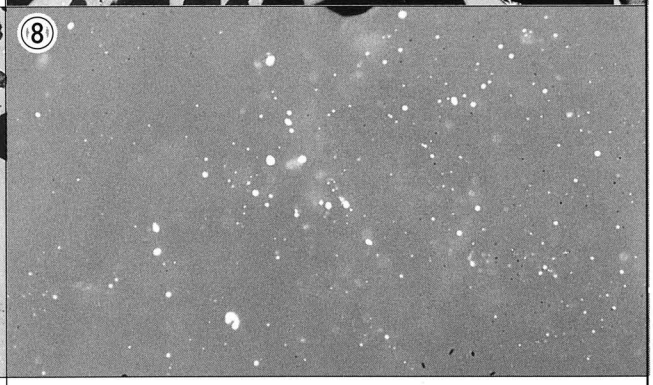



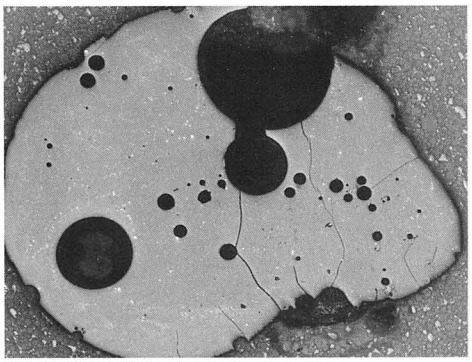




㊻NAK-13-ロ-2
粒状滓
2.4mm径、磁着弱

⑤×3　外観写真
⑩×20　マクロ組織（0.92）
⑥×50　⑦×100　⑧×400
暗黒色ガラス質スラグ中
の金属鉄・微粒子



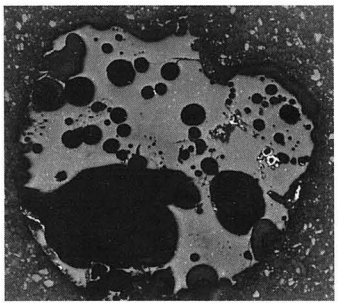
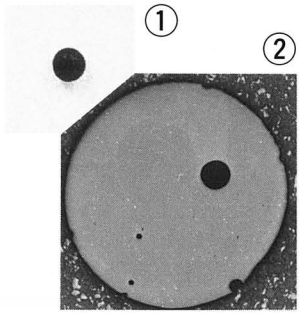
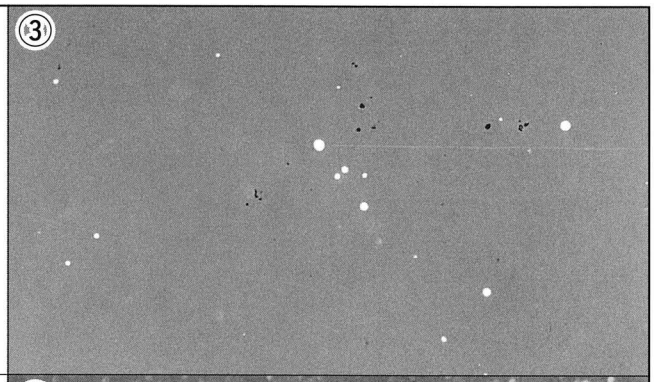




Photo.19　粒状滓の顕微鏡組織

㊼NAK-13-ロ-3
粒状滓
1.4mm径、磁着弱

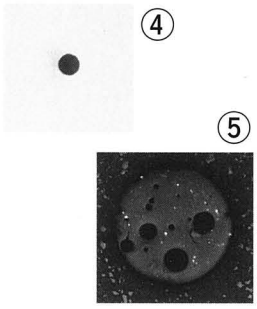
①×3　外観写真
②×20　マクロ組織
③×400
暗黒色ガラス質スラグ中
の金属鉄・微粒子



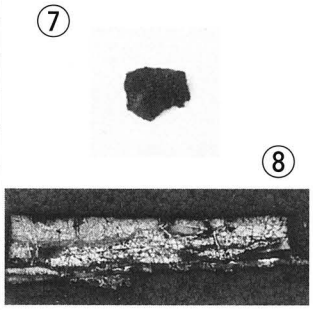

㊽NAK-13-ロ-4
粒状滓
0.9mm径、磁着弱

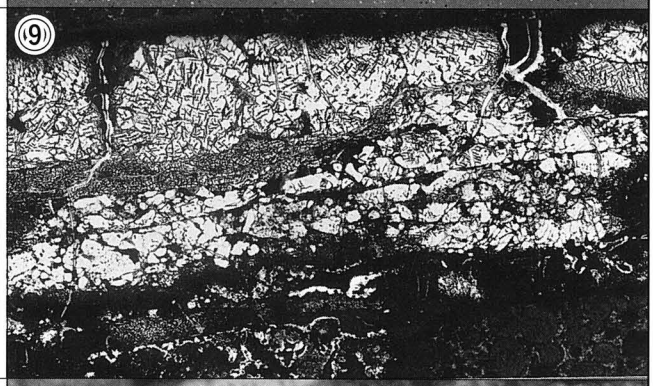
④×3　外観写真
⑤×20　マクロ組織
⑥×400
暗黒色ガラス質スラグ中
の金属鉄・微粒子



㊾NAK-14-イ-1
疑似鍛造剥片
0.42mm厚み　磁着弱

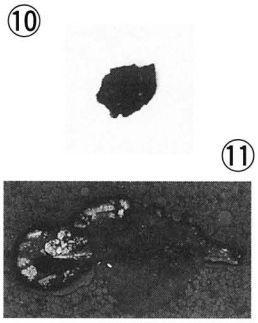
⑦×3　外観写真
⑧×20　マクロ組織
⑨×100
銹化鉄(ゲーサイト)




㊿NAK-14-イ-2
鍛造剥片
0.31mm厚み　磁着弱

⑩×3　外観写真
⑪×20　マクロ組織
⑫×400　no etch
⑬×100　⑭×400 王水etch
暗黒色ガラス質スラグ中
に小剥片を点在させる。



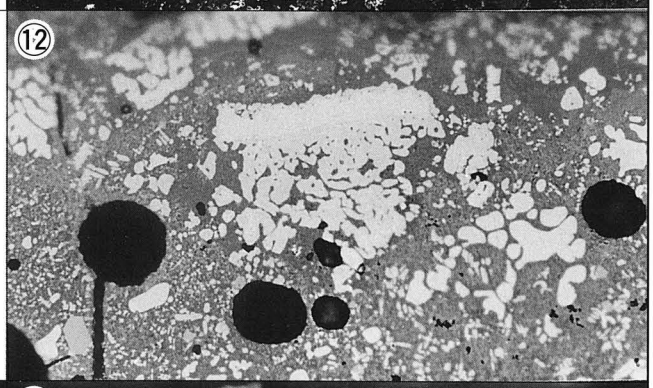



Photo.20　粒状滓と鍛造剥片の顕微鏡組織

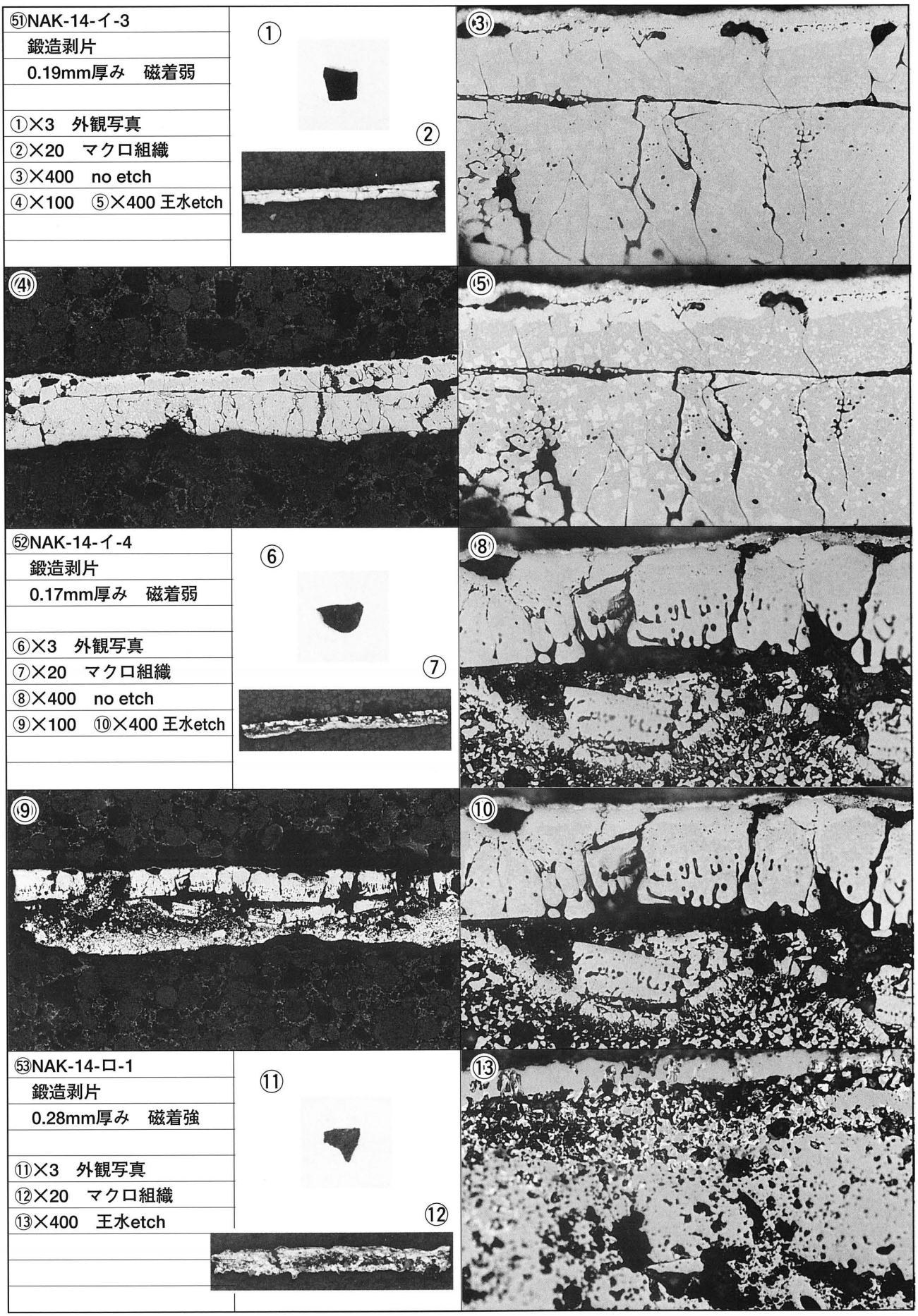



Photo.21　鍛造剥片の顕微鏡組織

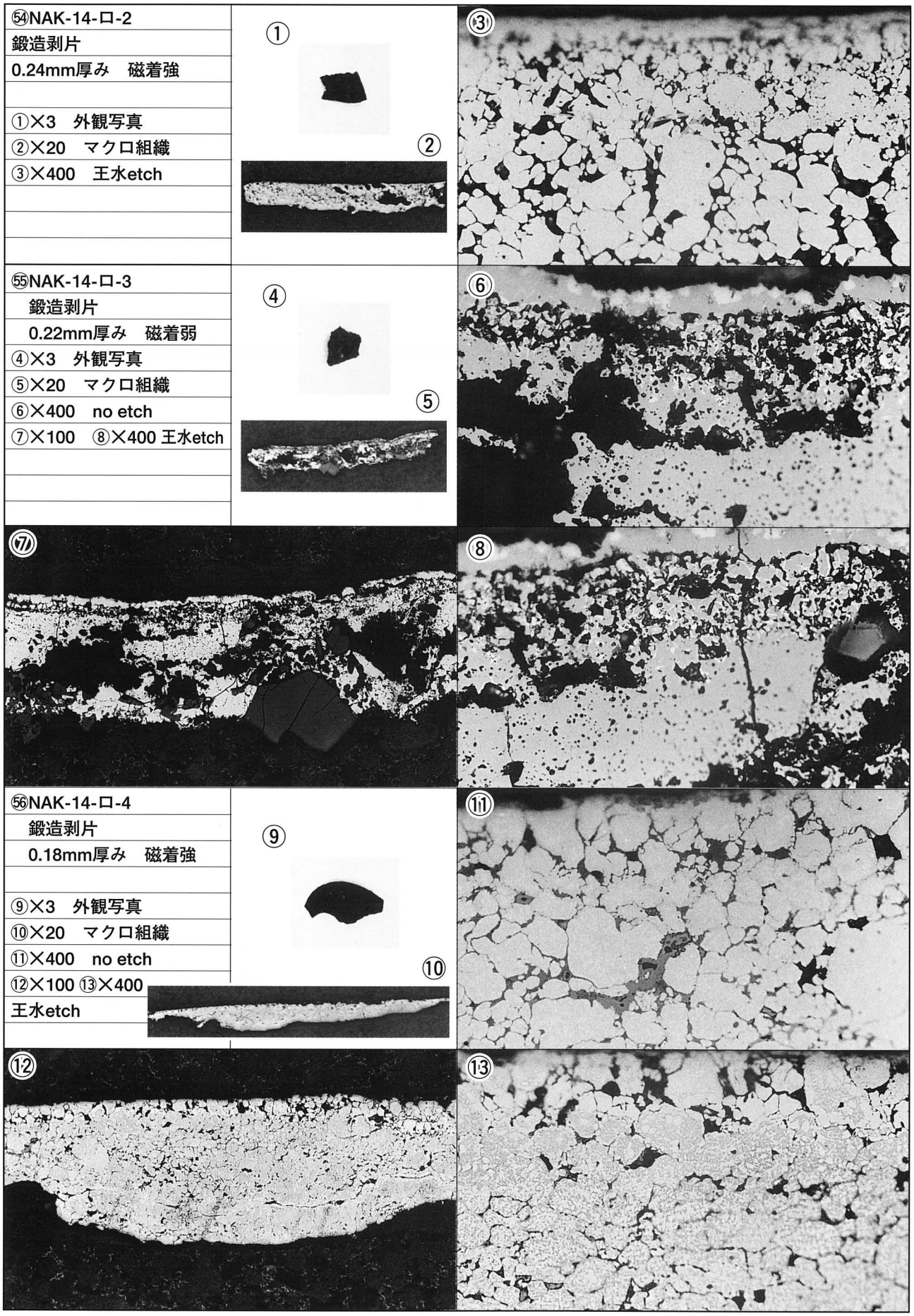



Photo.22　鍛造剥片の顕微鏡組織

| | |
|---|---|
| ㊼NAK-16(1) | |
| 含鉄椀形鍛冶滓 | |
| ①×400　非金属介在物(FeS) | |
| ②×100　ナイタルetch | |
| ③×400　②の左側拡大 | |
| ④×400　②の右側拡大 | |
| ⑤×100　⑥×400 | |
| High〔C〕領域 | |
| ⑦×100　⑧×400 | |
| Low〔C〕領域 | |

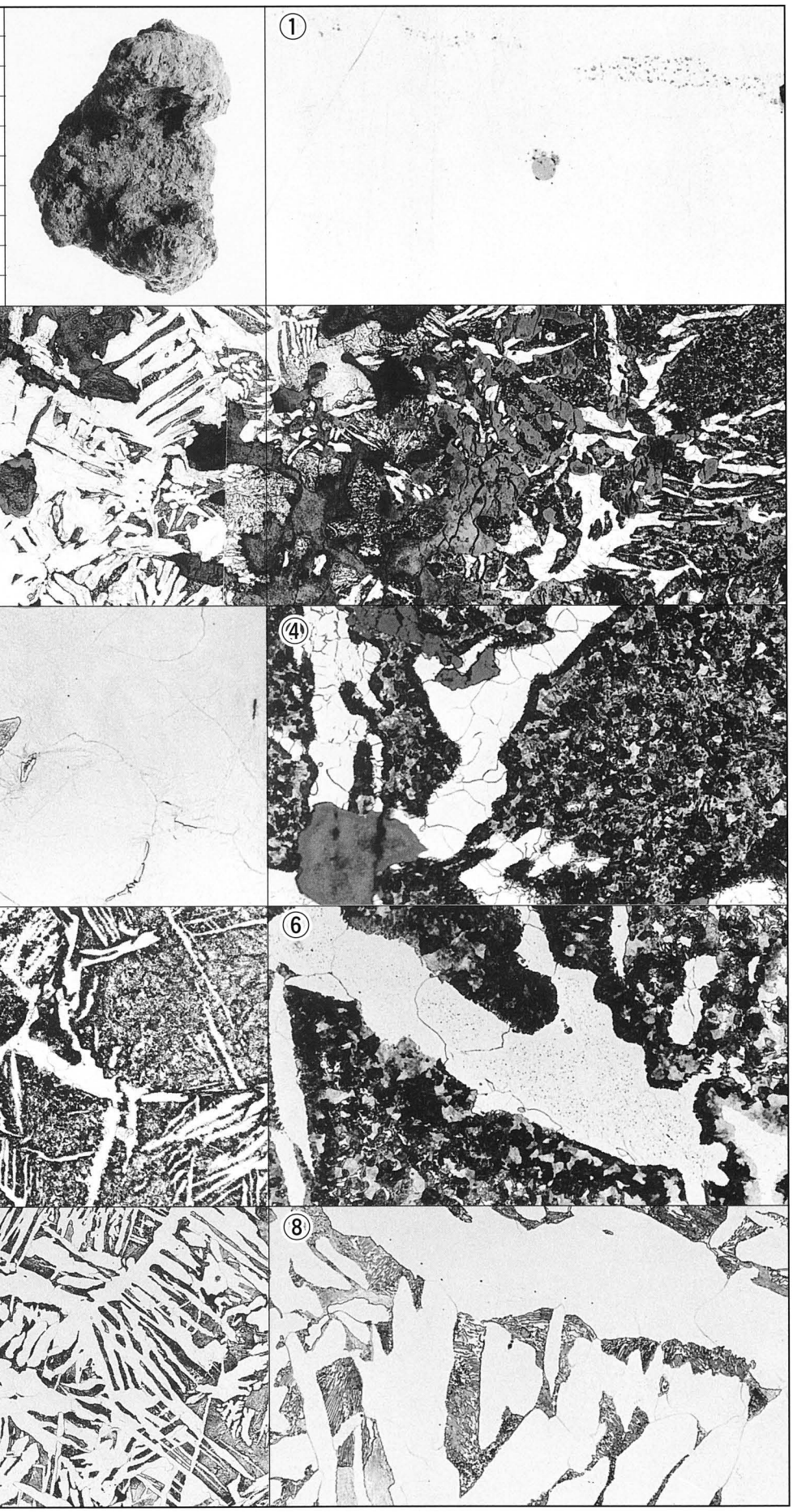



Photo.23　含鉄椀形鍛冶滓の顕微鏡組織

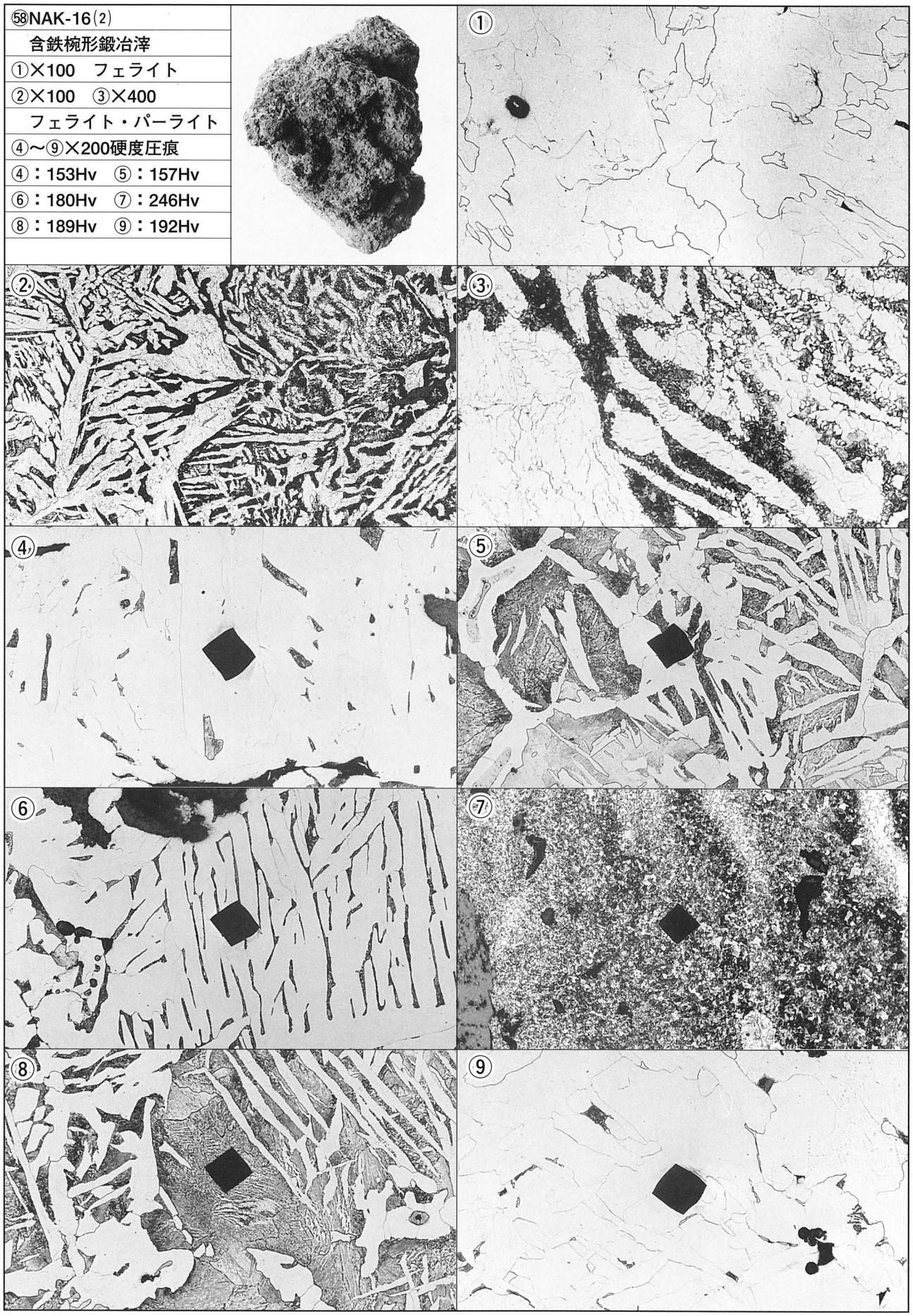



Photo.24　含鉄椀形鍛冶滓の顕微鏡組織

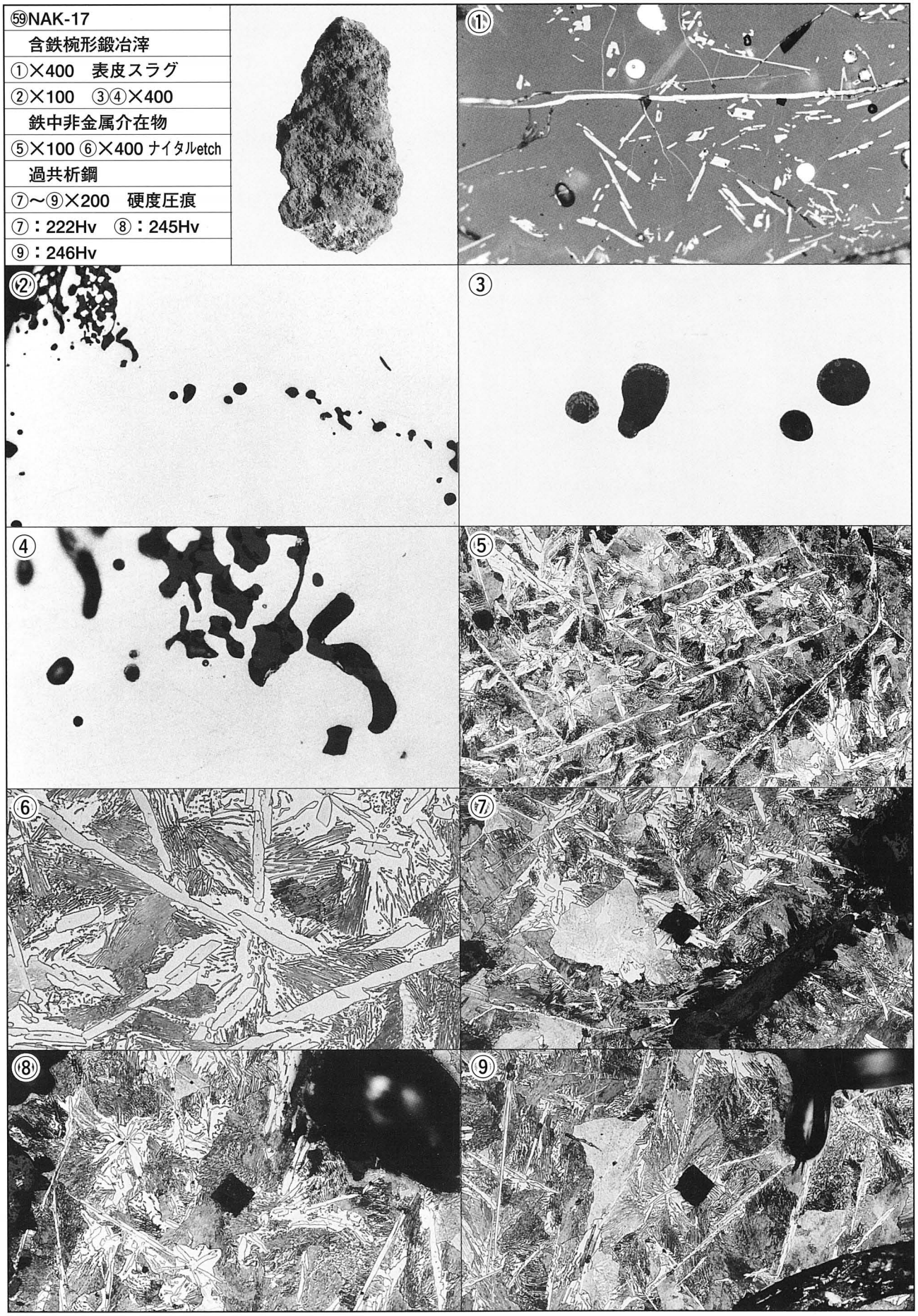



Photo.25　含鉄椀形鍛冶滓の顕微鏡組織

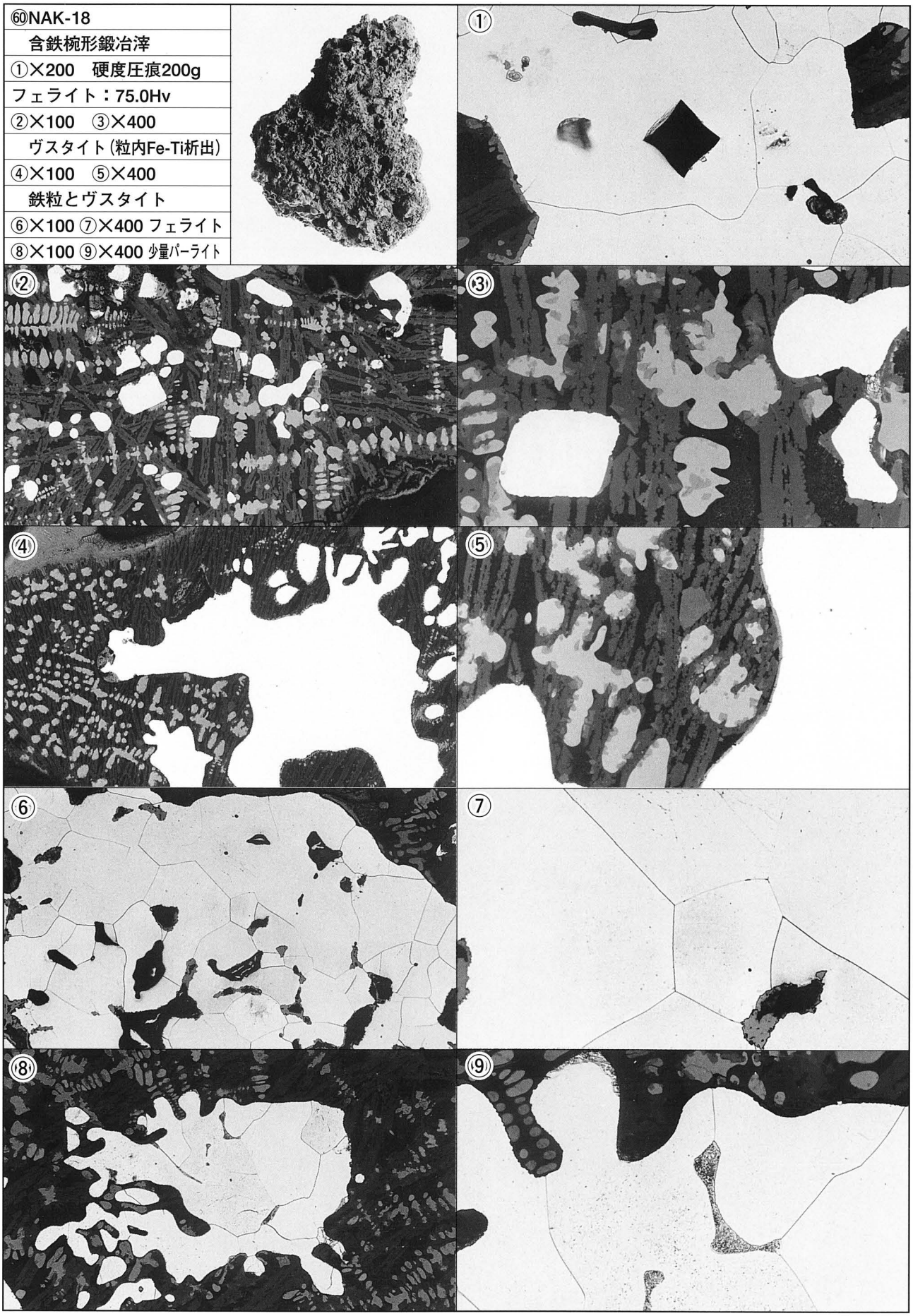



Photo.26　含鉄椀形鍛冶滓の顕微鏡組織

| | |
|---|---|
| ⑥1NAK-19 | |
| ①×400　非金属介在物 | |
| ②×100　③×400鍛造剥片 | |
| ④×100　⑤×400 | |
| 表皮スラグ(ヴスタイト)と金属鉄 | |
| フェライト | |
| ⑥×100　⑦×400 | |
| 針状フェライトとパーライト | |
| ⑧⑨×200　硬度圧痕 | |
| ⑧：84.0Hv　⑨：123Hv | |

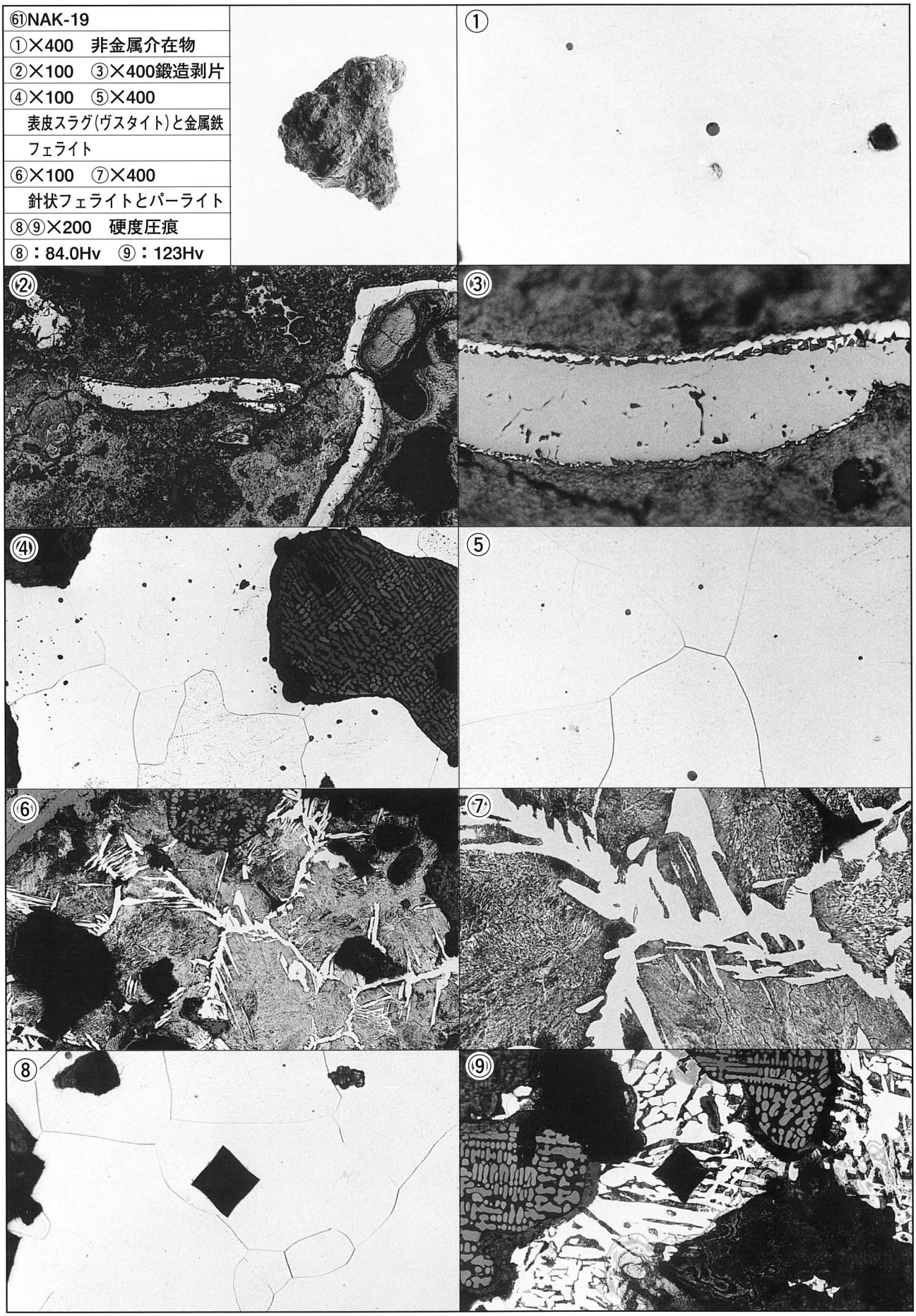



Photo.27　含鉄鉄滓の顕微鏡組織

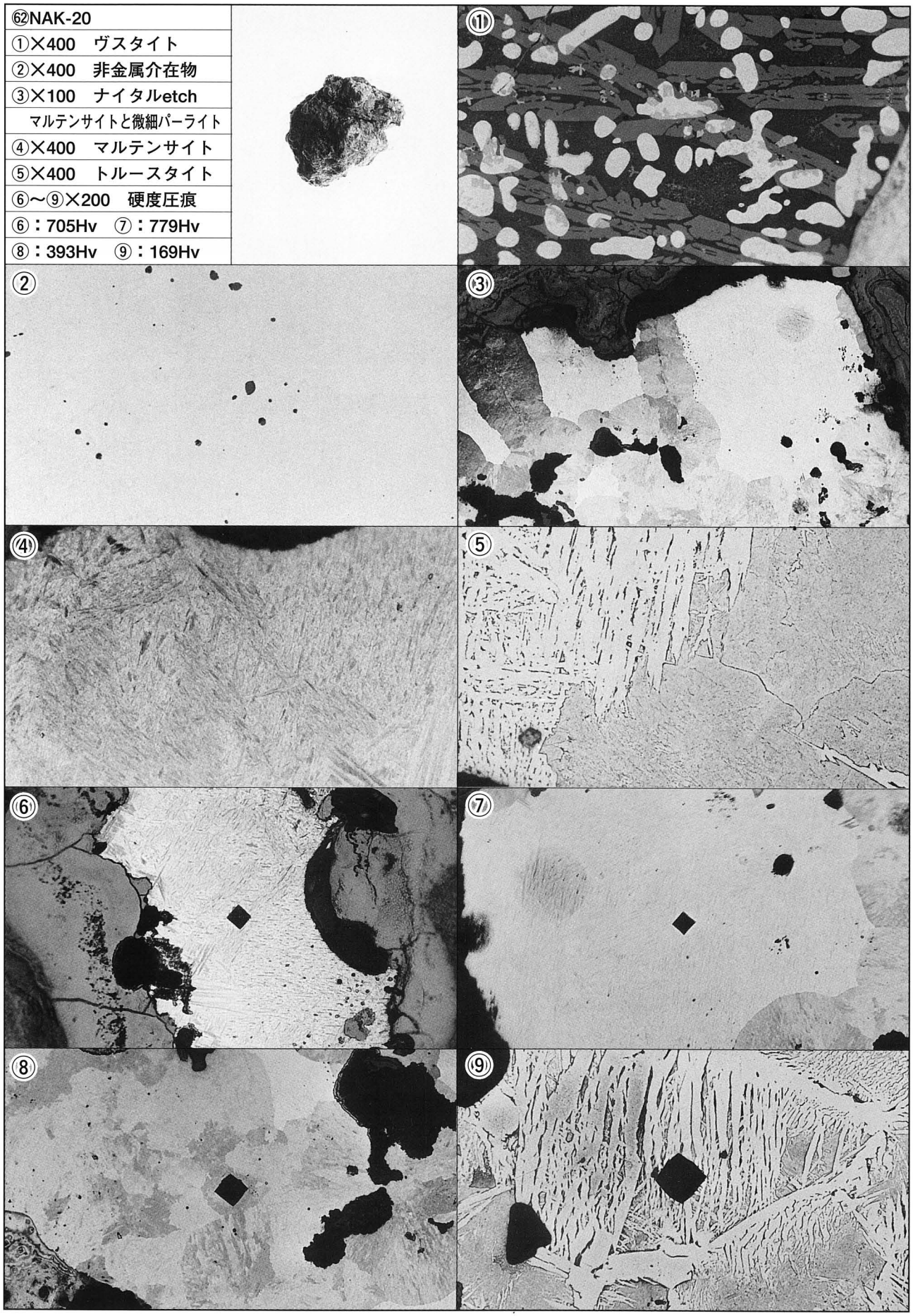
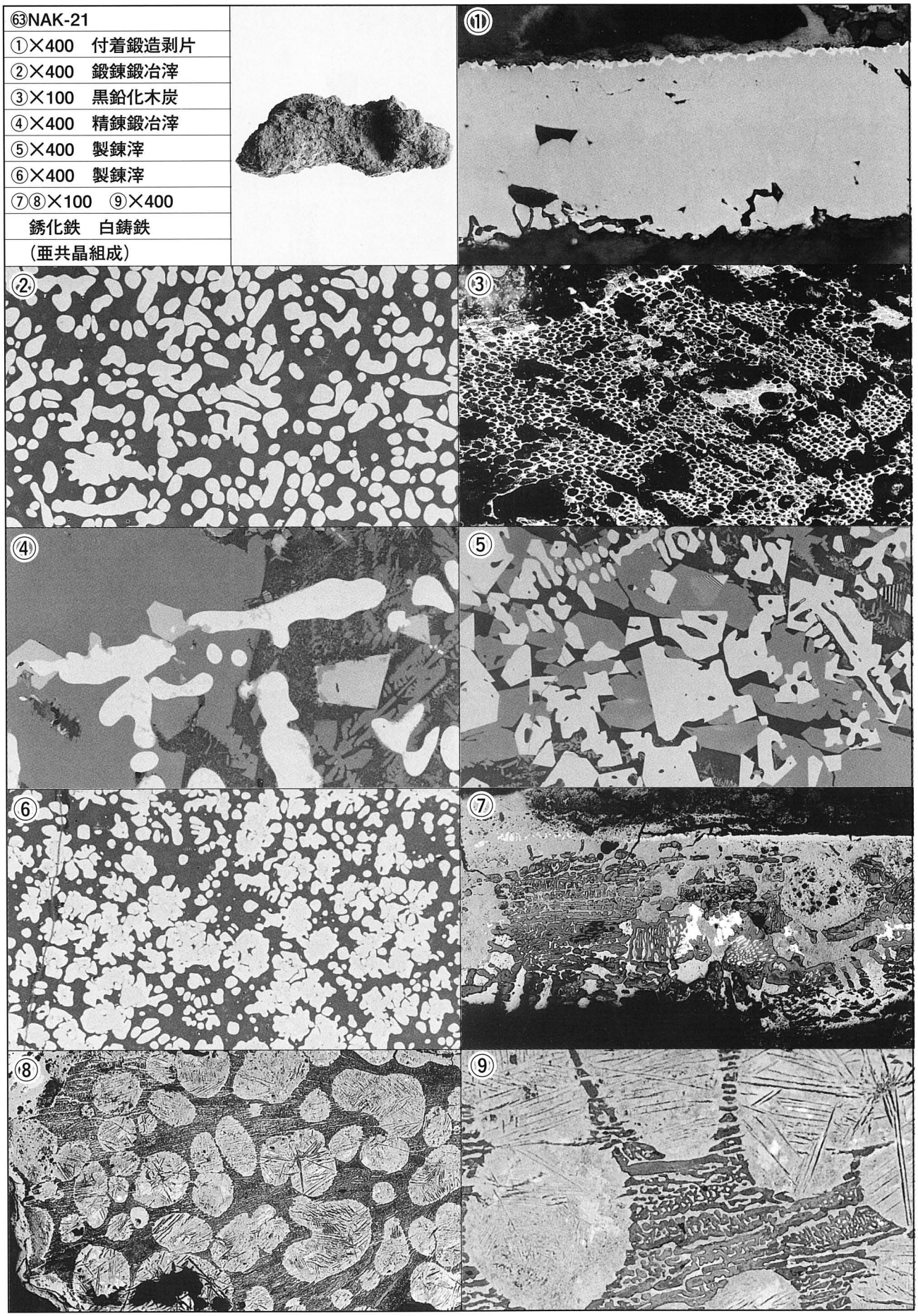



Photo.28　含鉄鉄滓の顕微鏡組織




⑬NAK-21
①×400　付着鍛造剥片
②×400　鍛錬鍛冶滓
③×100　黒鉛化木炭
④×400　精錬鍛冶滓
⑤×400　製錬滓
⑥×400　製錬滓
⑦⑧×100　⑨×400
銹化鉄　白鋳鉄
（亜共晶組成）

Photo.29　再結合滓の顕微鏡組織

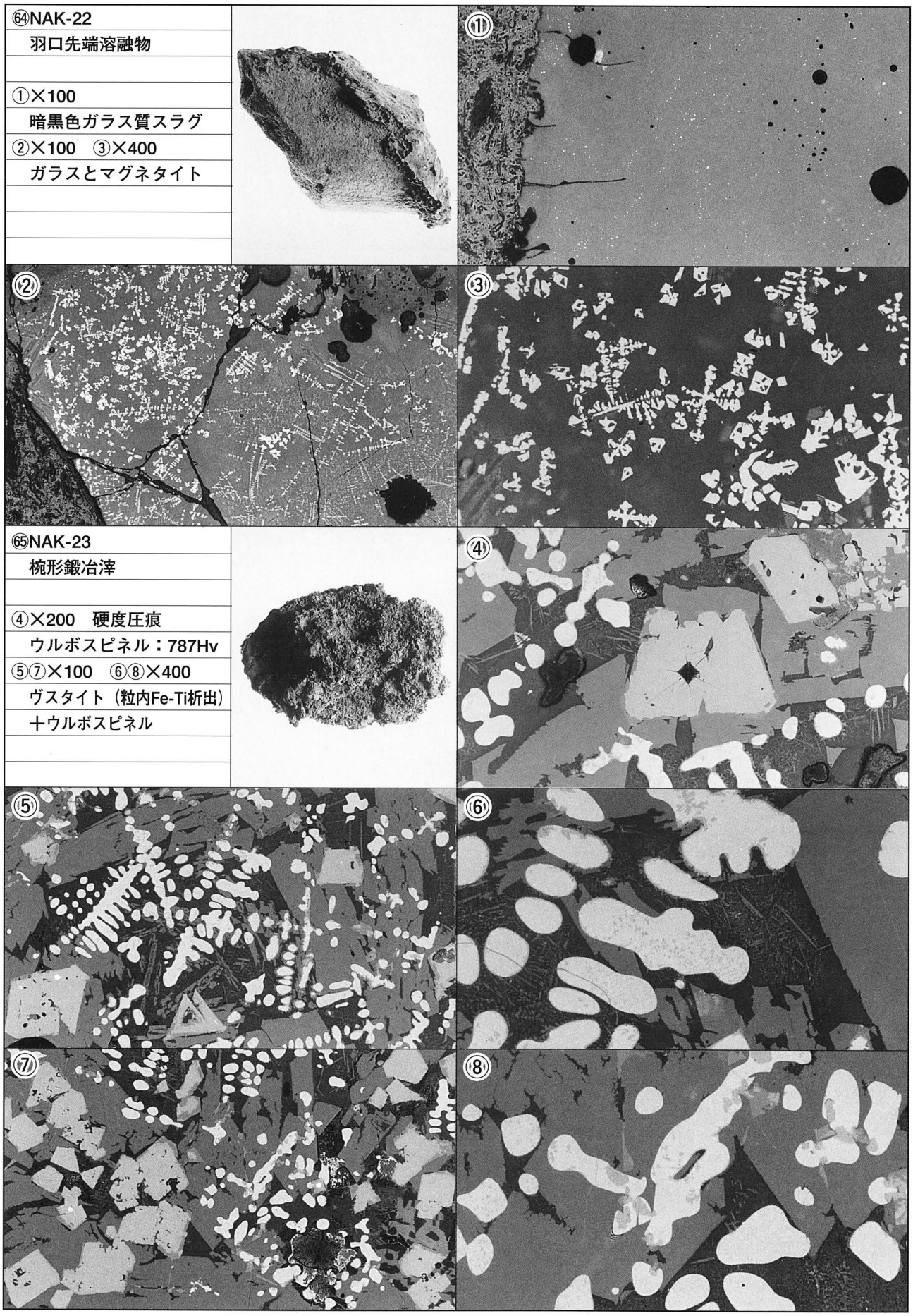



Photo.30　羽口と椀形鍛冶滓の顕微鏡組織

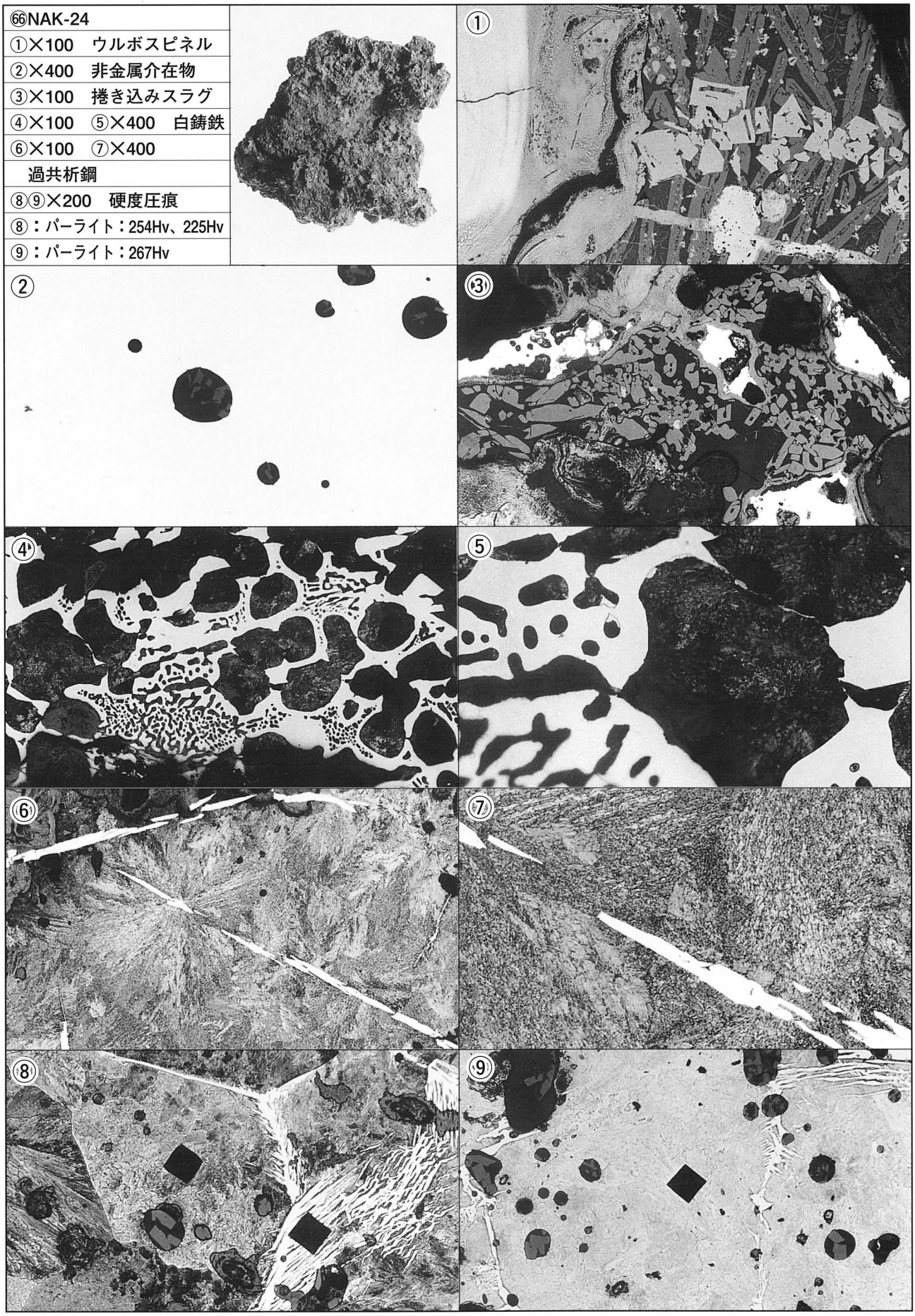



Photo.31　含鉄椀形鍛冶滓の顕微鏡組織

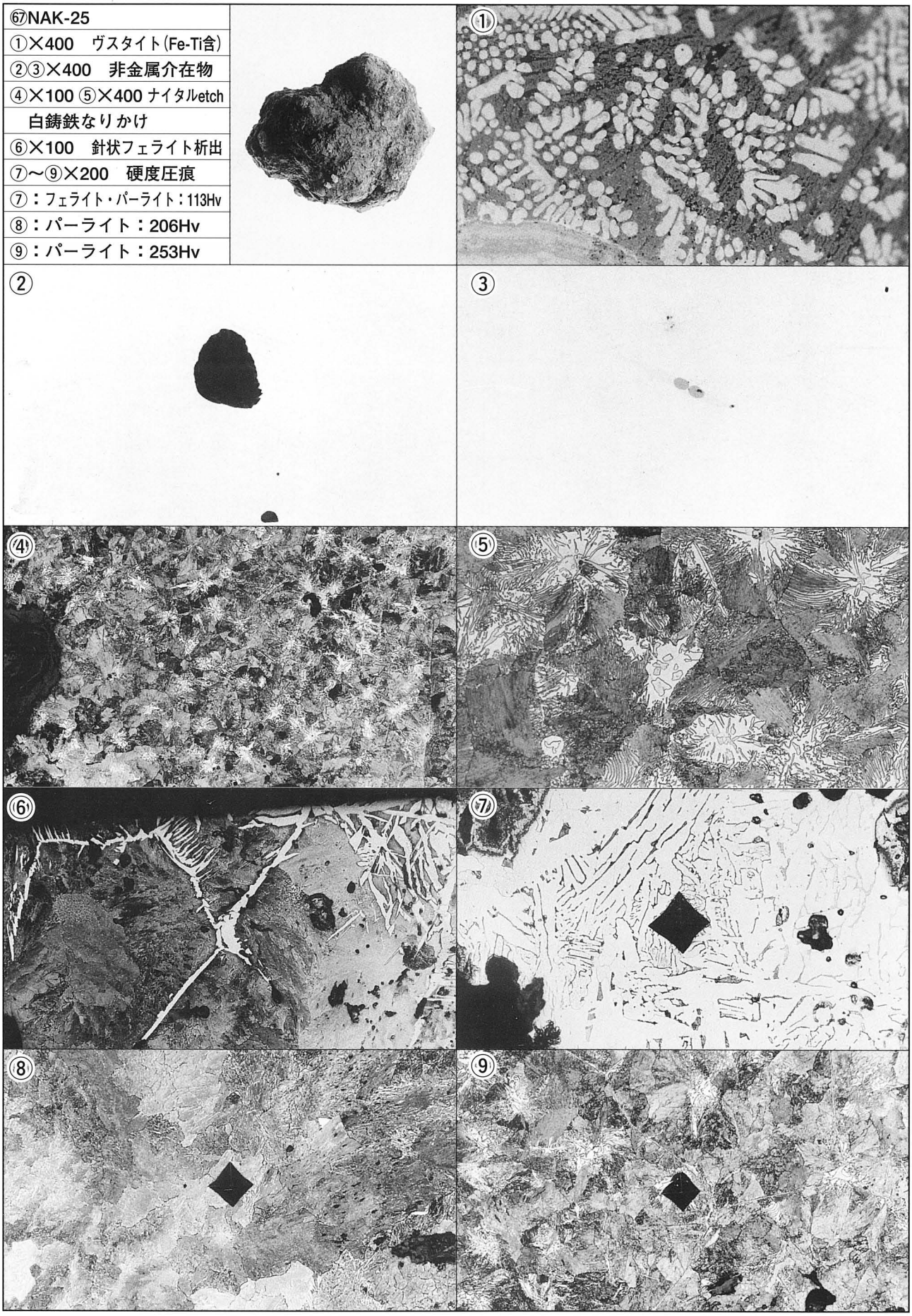



Photo.32　含鉄鉄滓の顕微鏡組織

| ⑱NAK-26 |
| --- |
| ①×400　ガラス質鍛造剥片 |
| ②×400　3層分離型剥片 |
| ③×400　ヴスタイト |
| ④×400　非金属介在物 |
| ⑤×100　ナイタルetch |
| フェライト |
| ⑥～⑨×200　硬度圧痕 |
| ⑥：96.0Hv　⑦：93.0Hv |
| ⑧：140Hv　⑨：880Hv |

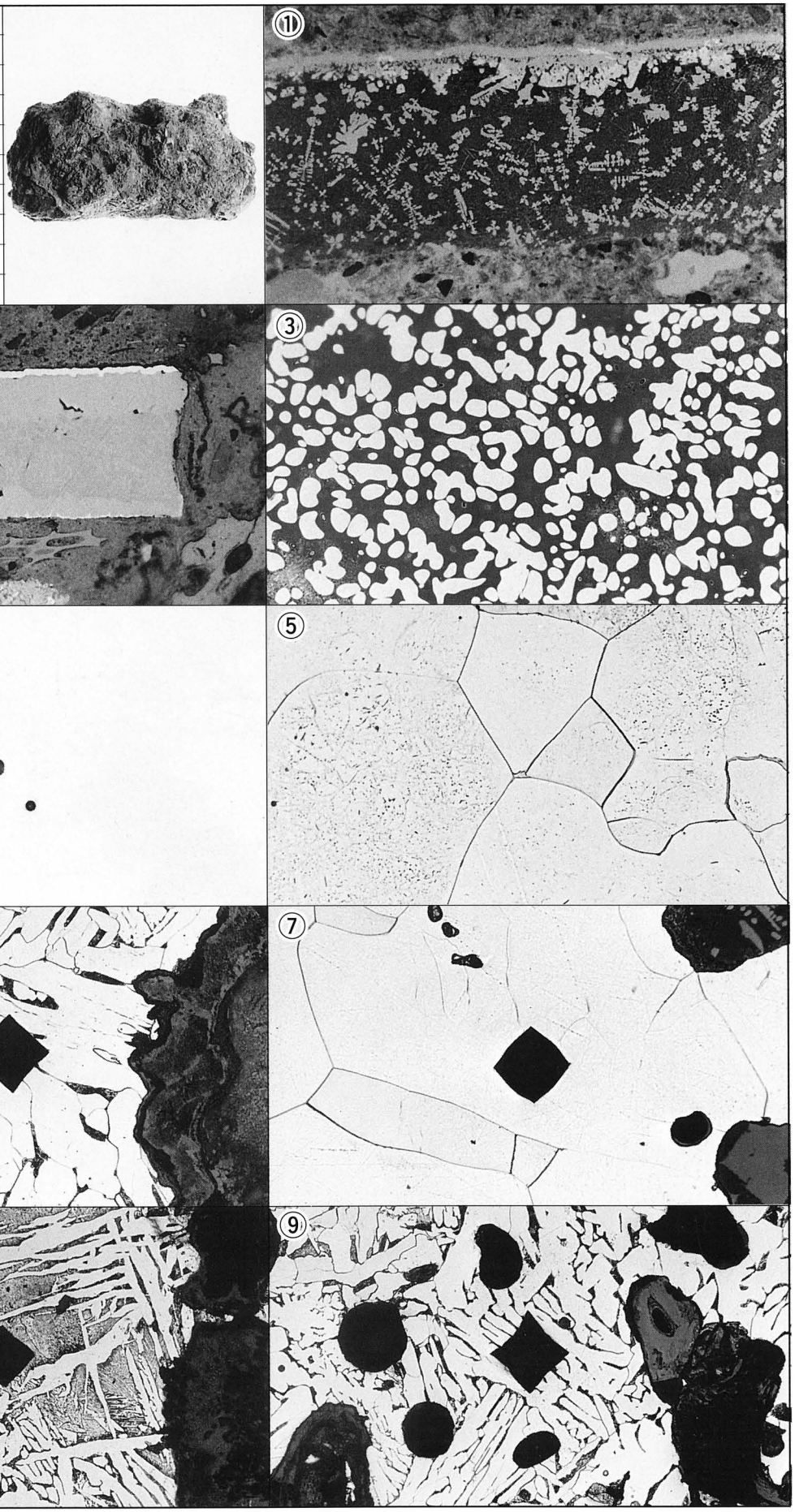



Photo.33　粗鉄鋌の顕微鏡組織

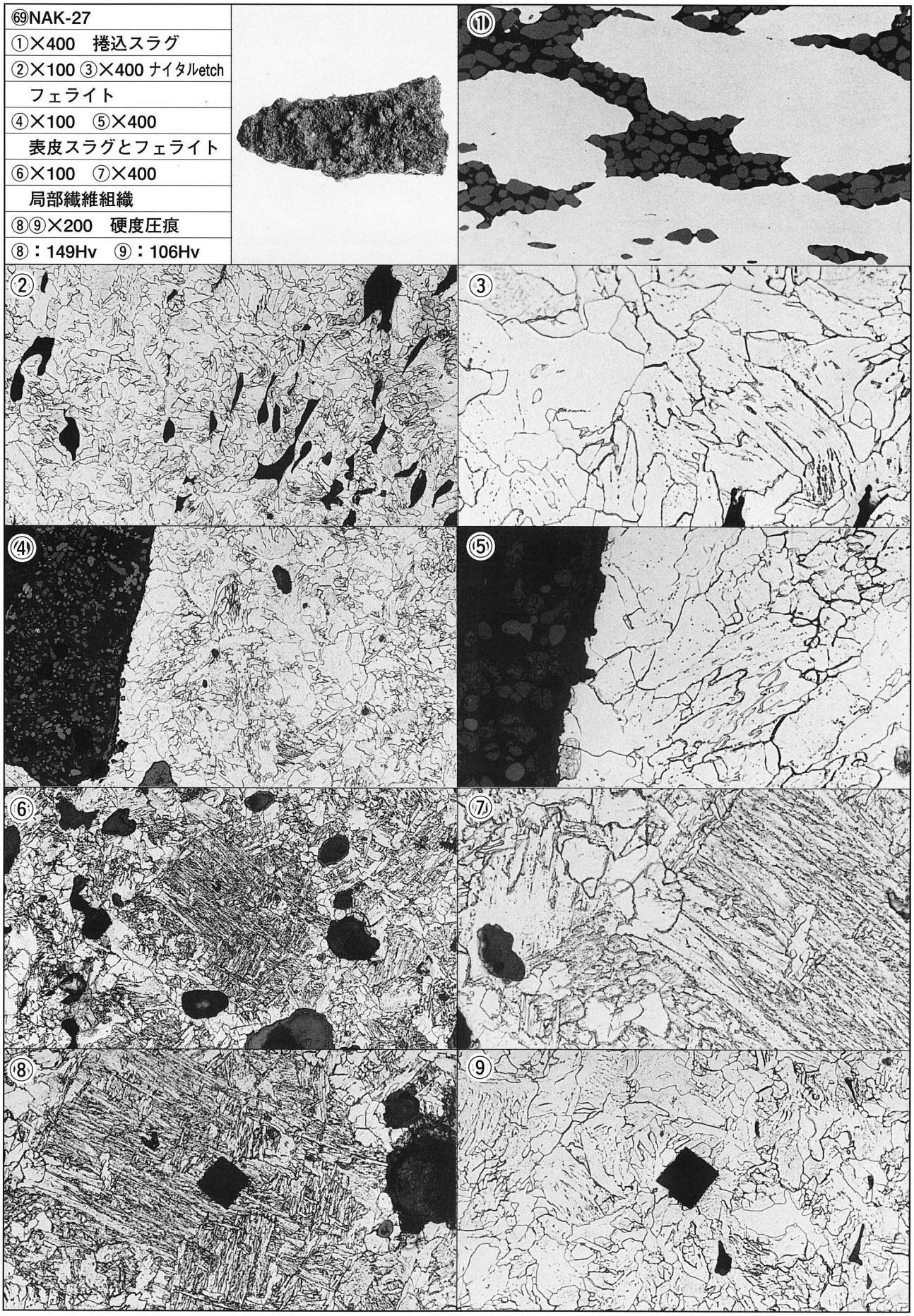
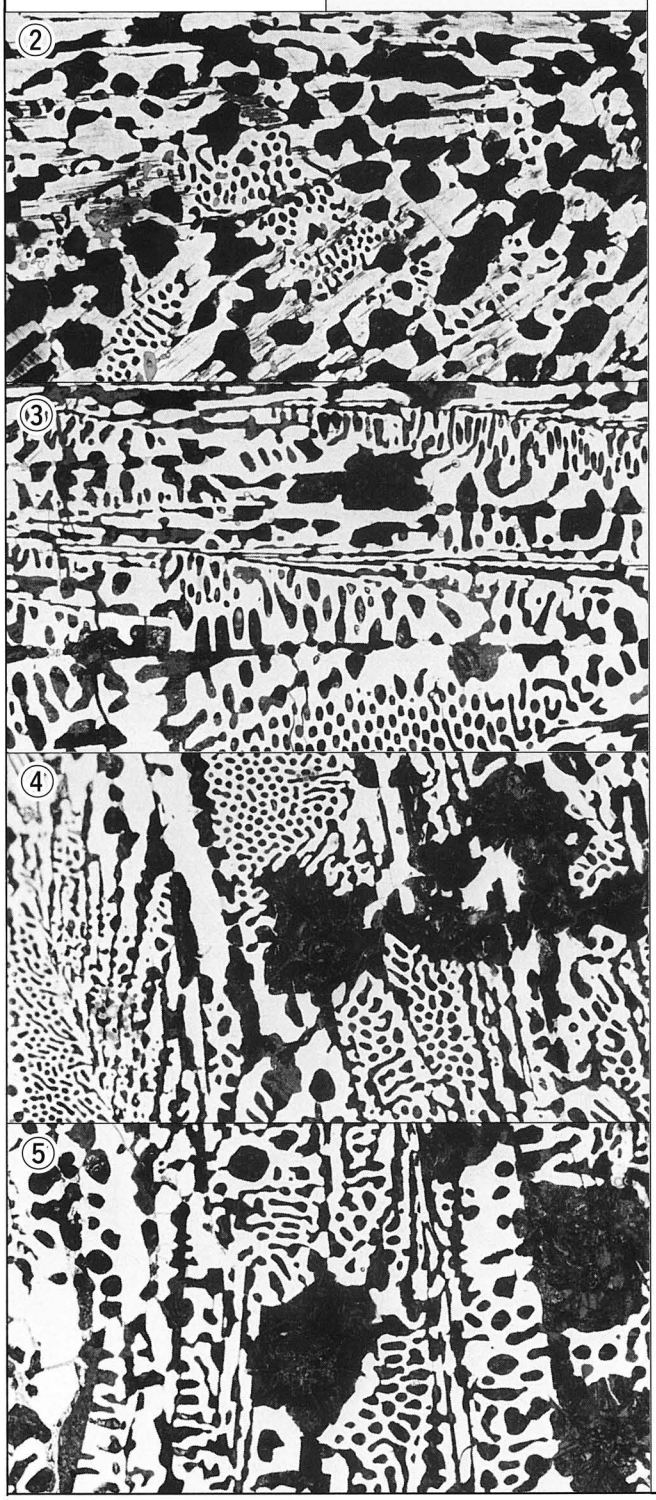



Photo.34　粗鉄鋌の顕微鏡組織

⑦⓪NAK-28(1)

①×50　ナイタルetch
まだら(斑)鋳鉄(縮小:0.7)
②③×400
鋳掛け側白鋳鉄
④⑤×400
まだら鋳鉄鍋本体




①

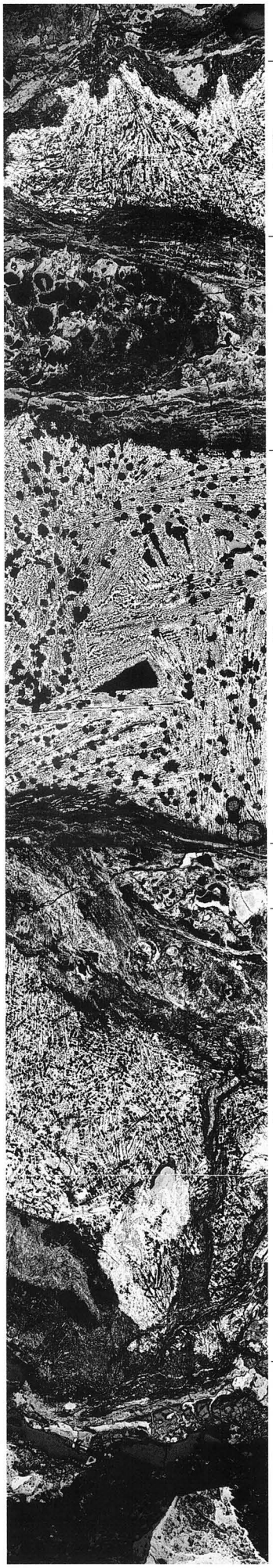



Photo.35　鉄鍋の顕微鏡組織