

## Chapter 3 Geochemical Prospecting by Heavy Minerals

### 3-1 Sampling Method

The heavy minerals in a fixed volume (1,000 cm<sup>3</sup>) of stream sediment were concentrated and extracted by professional panners.

As the Phase II survey aimed at delineating the area of chromite concentration, the heavy minerals were taken from all the tributaries in the ultramafic body encountered along the route of geological survey and from those where the complex is expected to occur on the upstream side.

### 3-2 Method of Separation

As shown in Table II-5, after weighing the heavy minerals obtained by panning, magnetic minerals were removed by hand magnet. Light minerals were removed by the use of clerici liquid (SG 4.2). Finally chromite was separated by hand picking from other heavy minerals under the microscope and weighed.

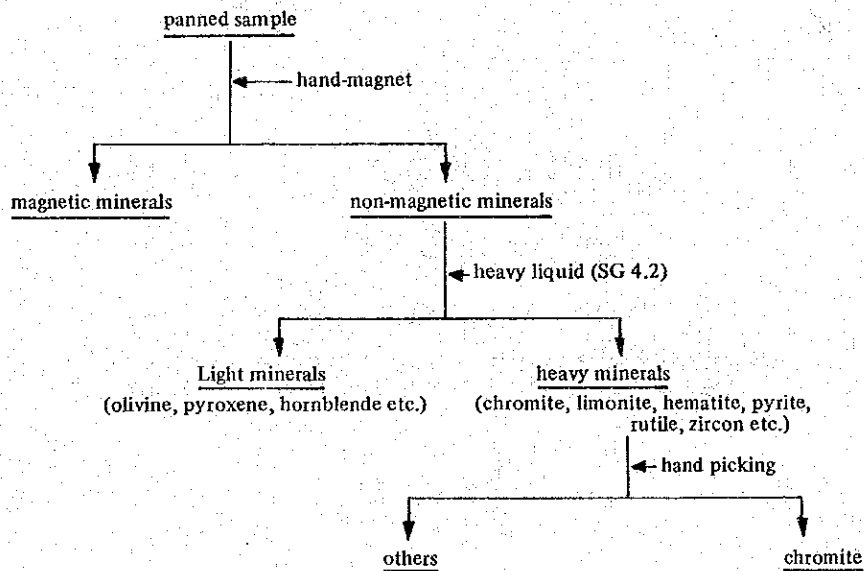


Fig. II-5 Flow Chart of Heavy Mineral Separation

The weight of each heavy mineral is shown in Table A-9.

### 3--3 Compilation and Interpretation of the Results

The weight of chromite ranges from trace to 1,662 mg, averaging 215 mg. The mean value generally approximates to the median value of the population. It showed, however, a high value corresponding to about 20 percent value from the highest. Therefore, the areas with higher value than 100 mg (corresponding to 40 %value from the highest) were also extracted in order to know the general trend of chromite concentration. Plate II--2 indicates the drainage basins with higher values than 100 mg, where the points with higher than 215 mg are discriminated from those with 100 mg to 214 mg.

As shown in the Plate, in the Ogos complex, the high values exceeding 1,400 mg were obtained in the Ogos deposit creek, tending to extend westward. An anomalous area is found on the southern side of the complex in the drainage basin of the Aglubang River at the eastern boundary of the complex, suggesting the occurrence of different horizon of chromite from the Ogos deposit. Both zones well coincide with the Cr anomalous zones extracted by geochemical stream sediment survey, so it is desirable to conduct the detailed survey in order to clarify the chromite occurrence.

In the Bongabong complex, a moderate concentration is found in the adjacent area of the Banus deposit, and the highest values of 1,600 mg was obtained in the upper stream of the Sumagui River on the southern part. As chromite was detected by panning last year in the Bansud River which is located between the above two rivers, the area extending from the Banus deposit to the Sumagui River can be expected as having potential for chromite deposit.

It can be pointed out that, in this Bongabong complex, the chromite concentration is limited on the eastern slope and nothing comes out on the Bongabong drainage basin side, like the geochemical stream sediment survey results.

As for the Pintin ultramafic body distributed on the western side, chromite tends to concentrated on the eastern side rather than on the western side, even if some biased sampling (because of limited number of creeks for sampling) is taken into account. Some chromite dissemination were found on the eastern side by geological survey. A moderate concentration ranging from 400 to 500 mg was obtained in the vicinity of the Paragpogan nickel deposit previously described.

A close relation is observed between the deposit and the amount of chromite, such as 862 mg on the eastern side of the Liwliw deposit and 589 mg in the area of the Igsoso deposit. It is, therefore, recommended to conduct the detailed survey by heavy minerals over the whole ultramafic bodies.

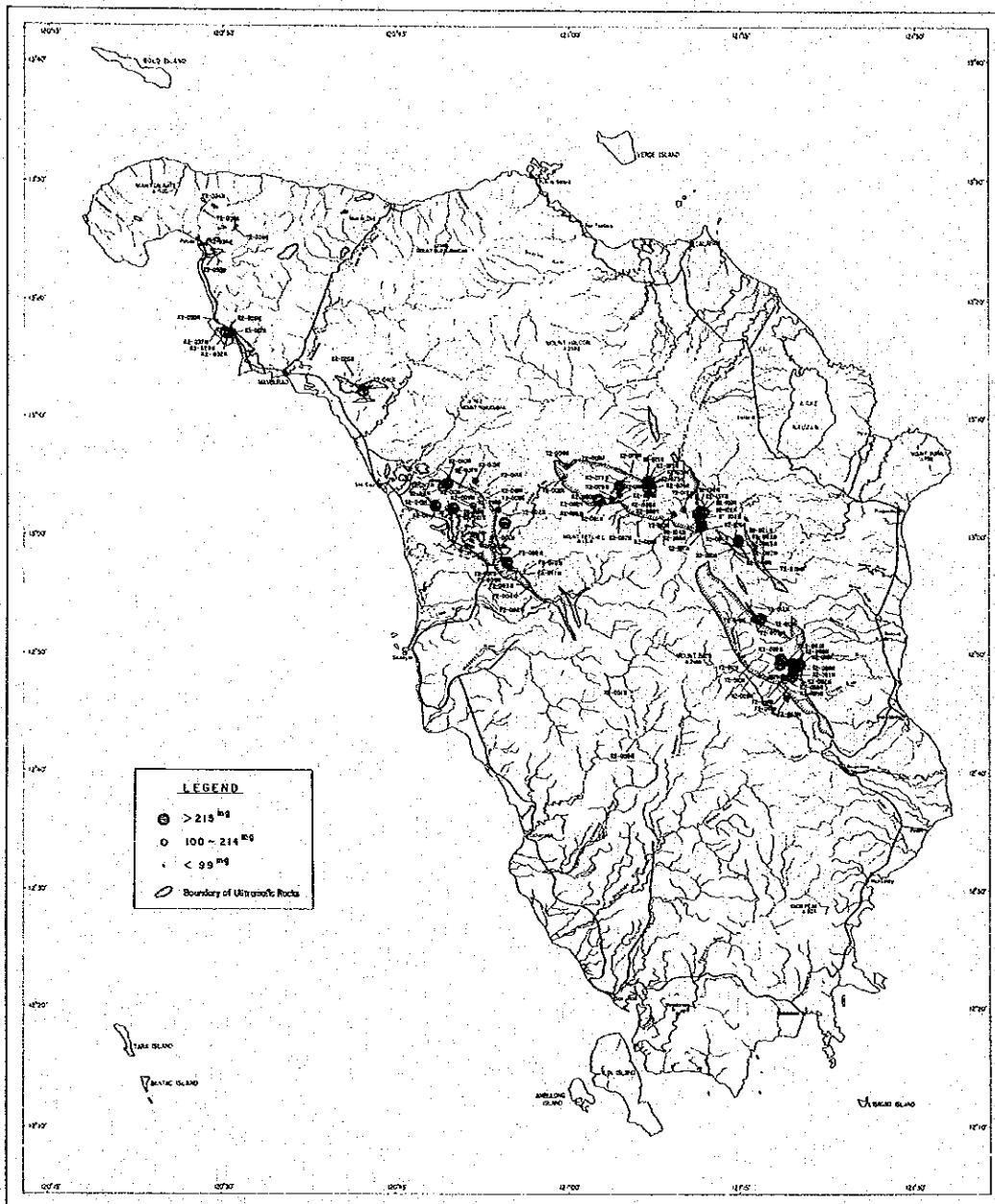
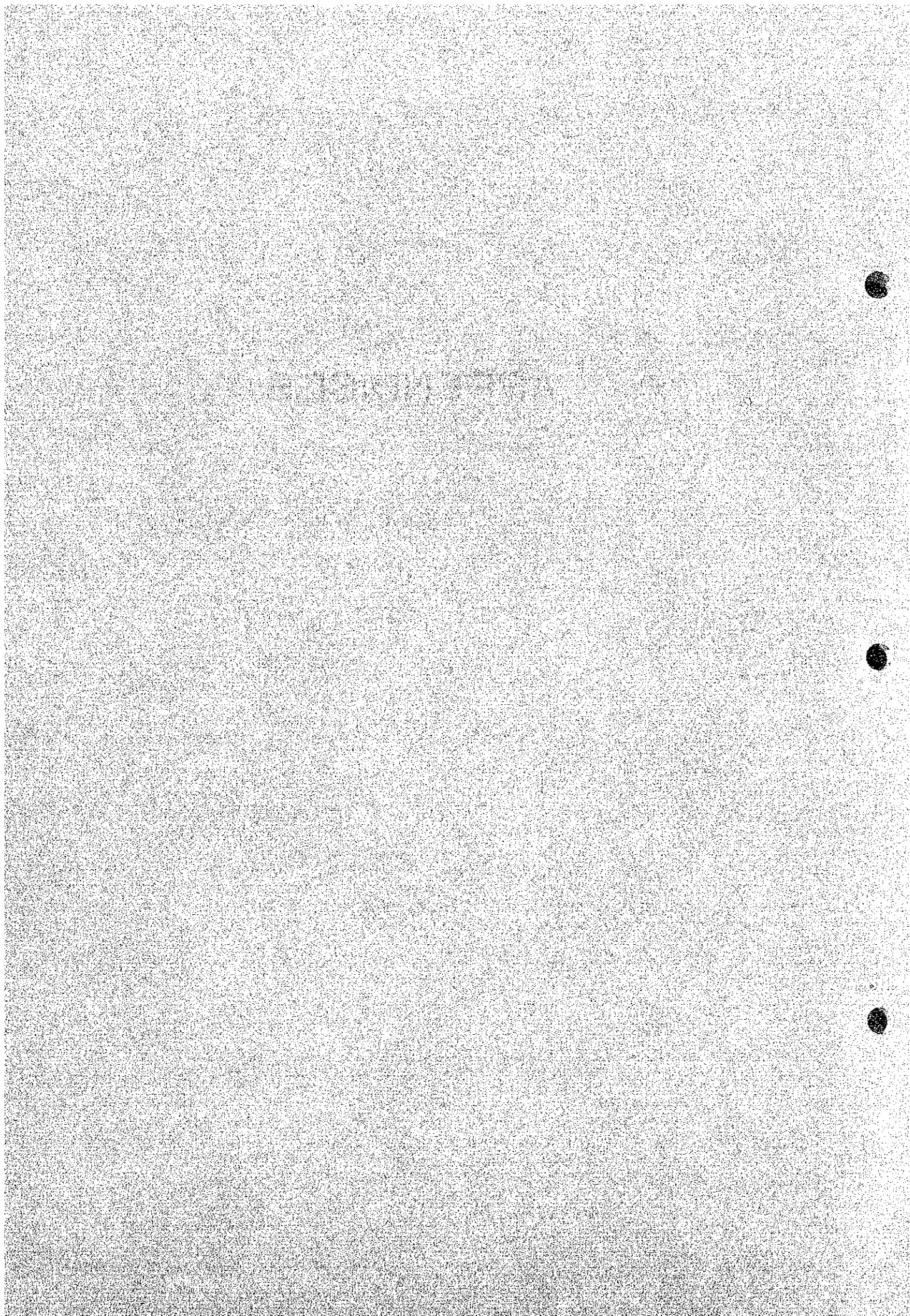


Fig. II-6 Distribution of Heavy Mineral(Chromite)

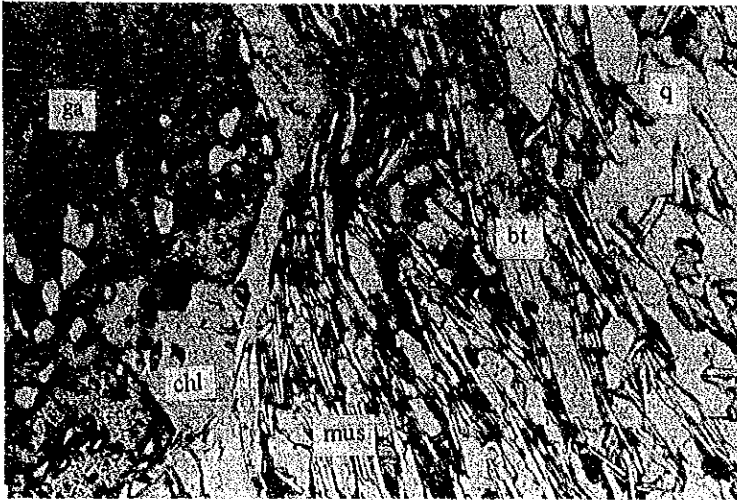
# APPENDICES



## Fig. A-1 Microphotograph of Thin Section

### Abbreviation

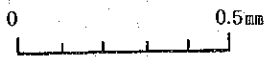
q	:	quartz
kf	:	potash feldspar
pl	:	plagioclase
bt	:	biotite
mus	:	muscovite
hb	:	hornblende
au	:	augite
hy	:	hypersthene
ol	:	olivine
en	:	enstatite
act	:	actinolite
ga	:	garnet
op	:	opaque minerals
ep	:	epidote
ser	:	sericite
chl	:	chlorite
srp	:	serpentine
sph	:	sphene
sp	:	spinel
zeo	:	zeolite



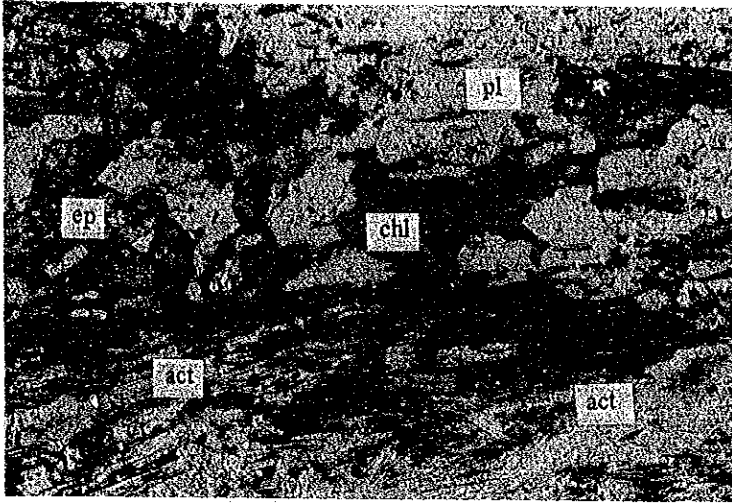
Only lower polar



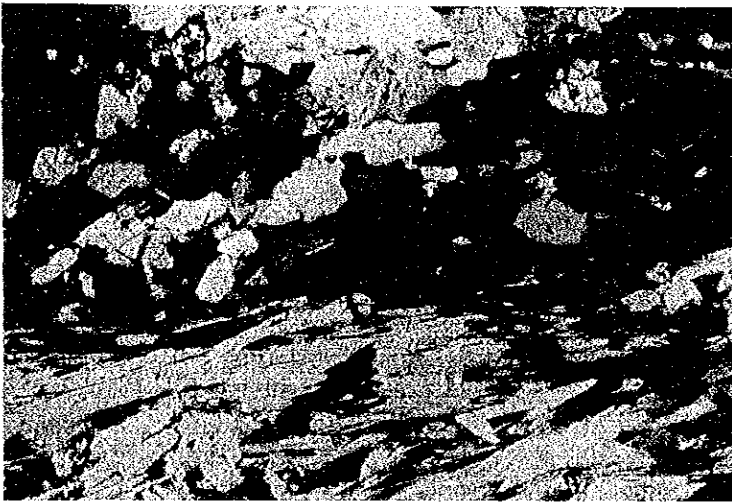
Crossed polars



Sample No. : TR2-154  
Location : Dulangan River  
Rock name : ga-mus-bt-chl schist  
Group name : Halcon metamorphics



Only lower polar

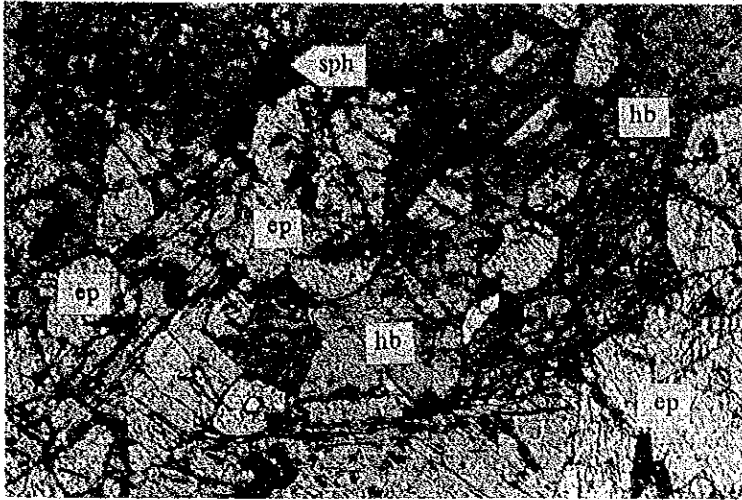


Crossed polars



Sample No. : YR2-049  
Location : Pontangotoyan River  
Rock name : ep-chl-act schist  
Group name : Halcon metamorphics

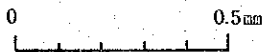




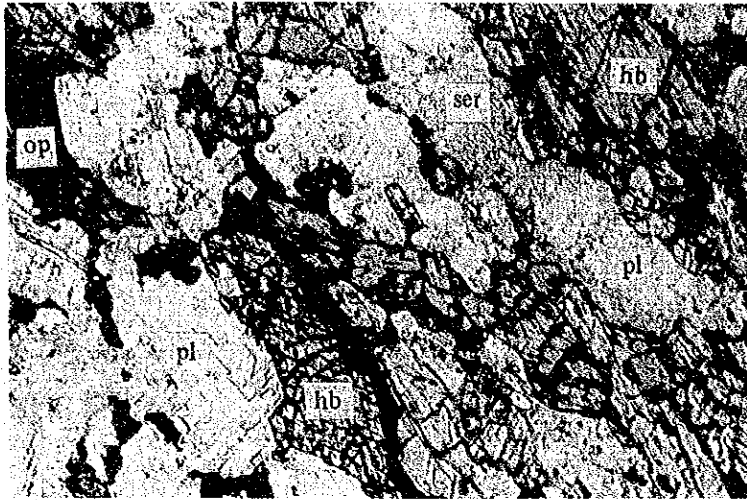
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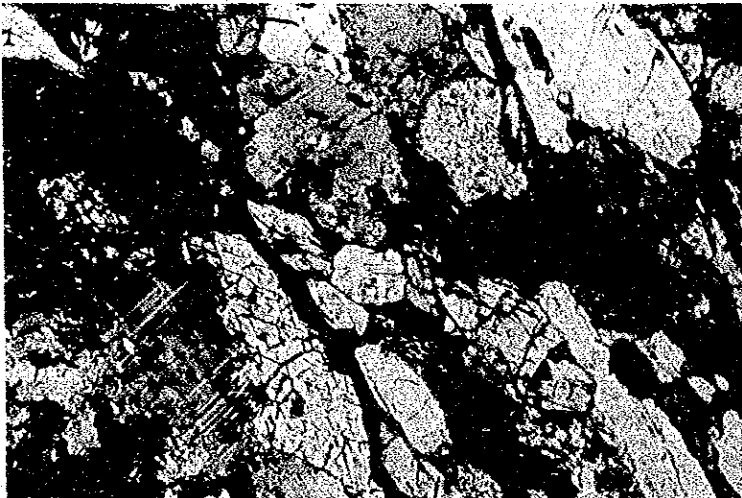
Crossed polars



Sample No. : KR2-111  
Location : Ogos River  
Rock name : ep amphibolite  
Group name : Halcon metamorphics



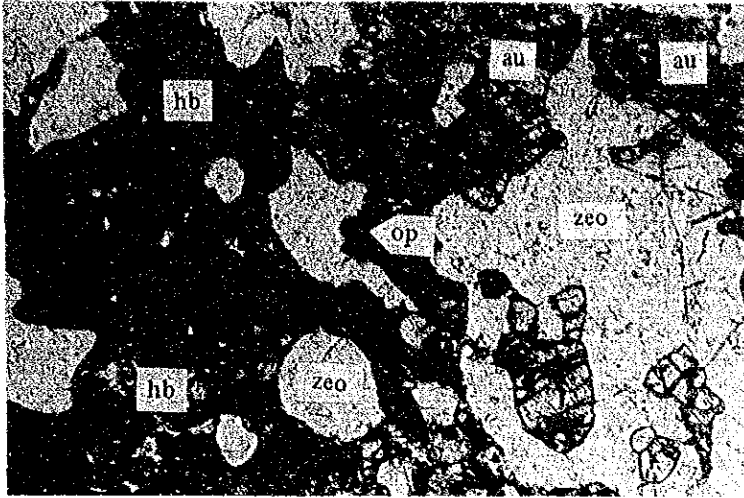
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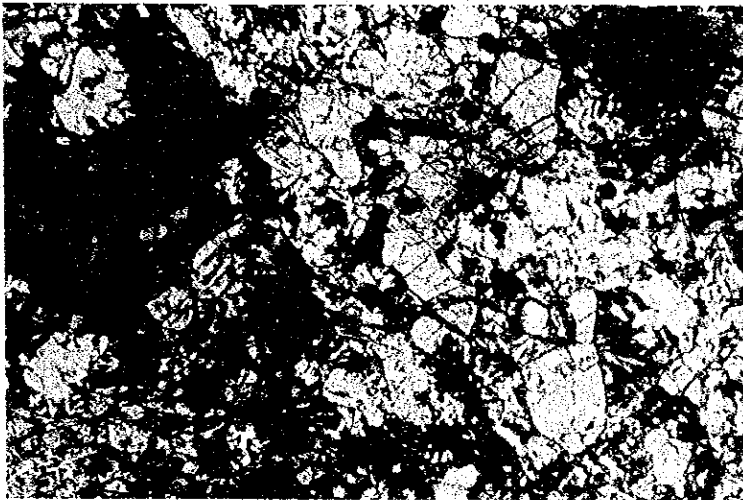
Crossed polars

0 0.5mm

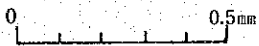
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Location : Amnay River  
Rock name : amphibolite  
Group name : Halcon metamorphics



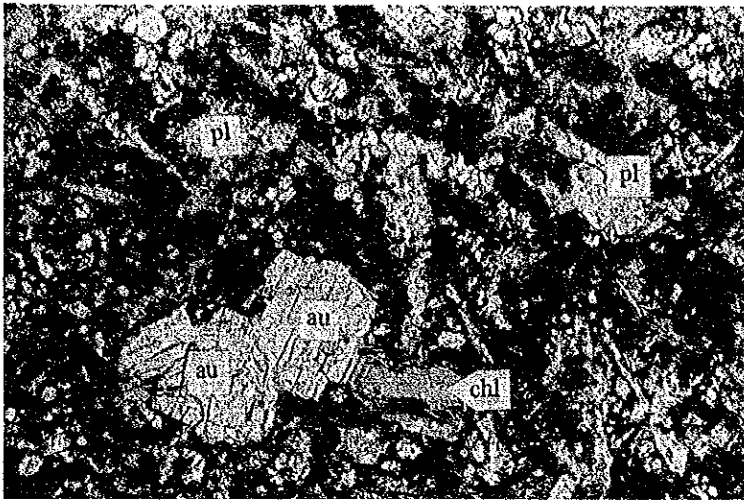
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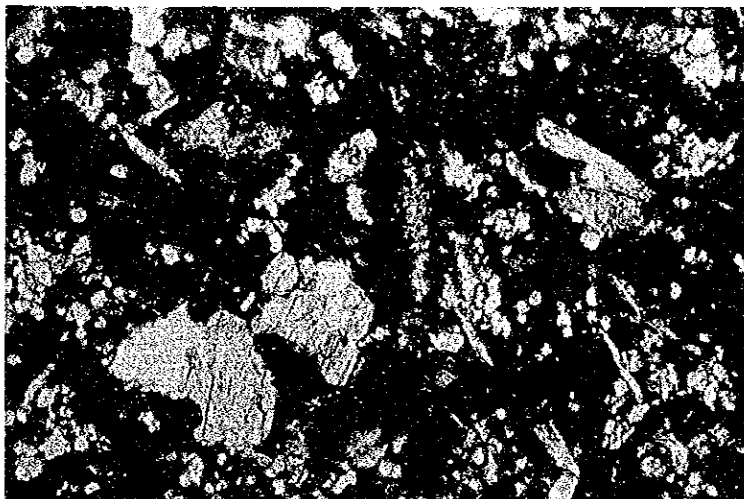
Crossed polars



Sample No. : TR2-136  
Location : Banus River  
Rock name : Granulite  
Group name : Halcon metamorphics



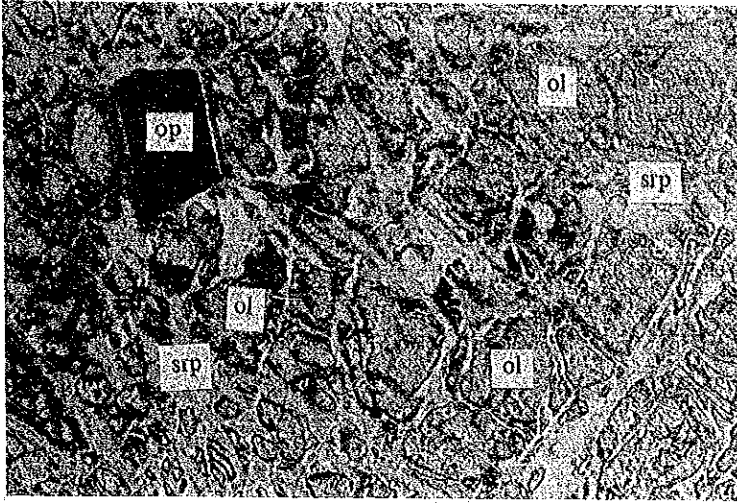
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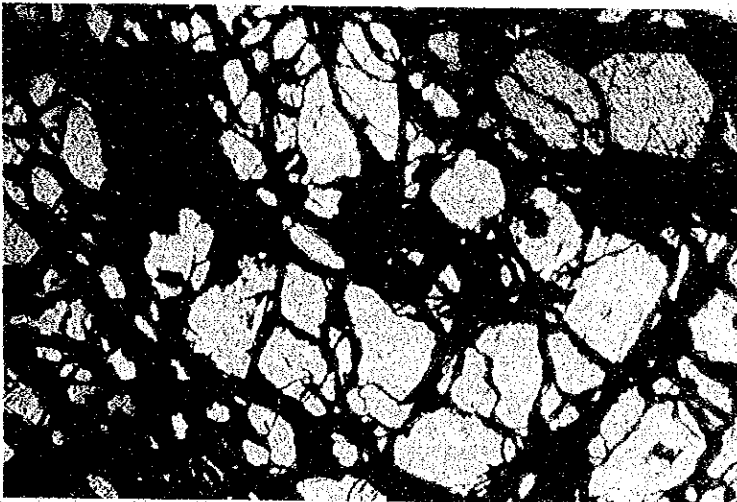
Crossed polars



Sample No. : KR2--014  
Location : Lumintao River  
Rock name : Basalt  
Group name : Lumintao formation



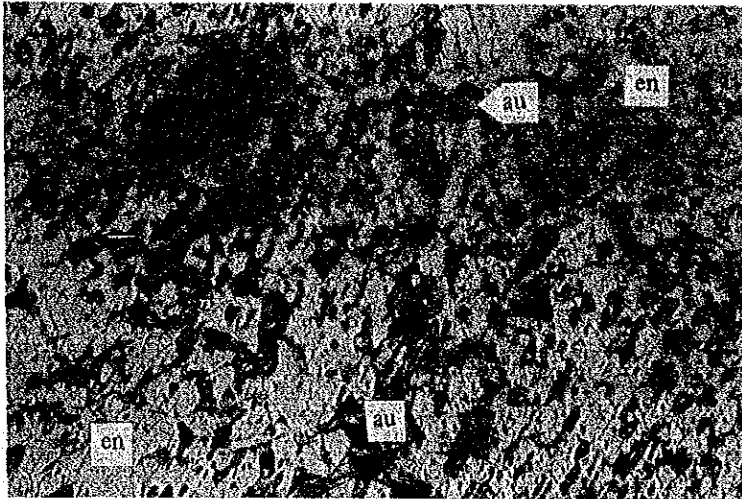
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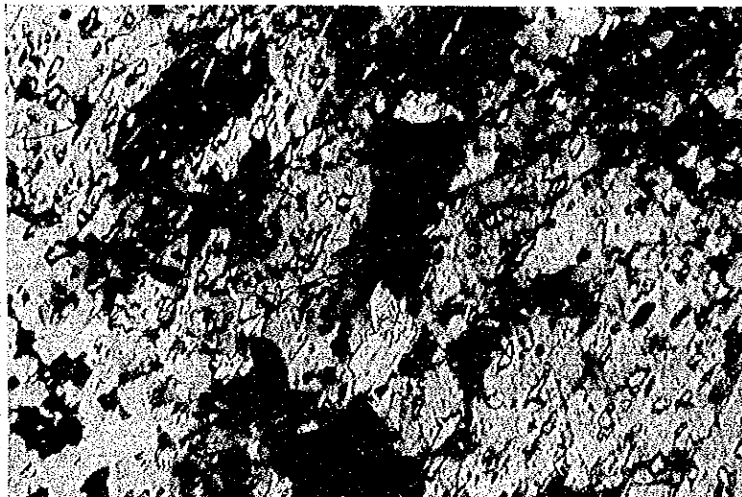
Crossed polars



Sample No. : KR2-100  
Location : Ogos River  
Rock name : Dunite  
Group name : Ultramafic complex



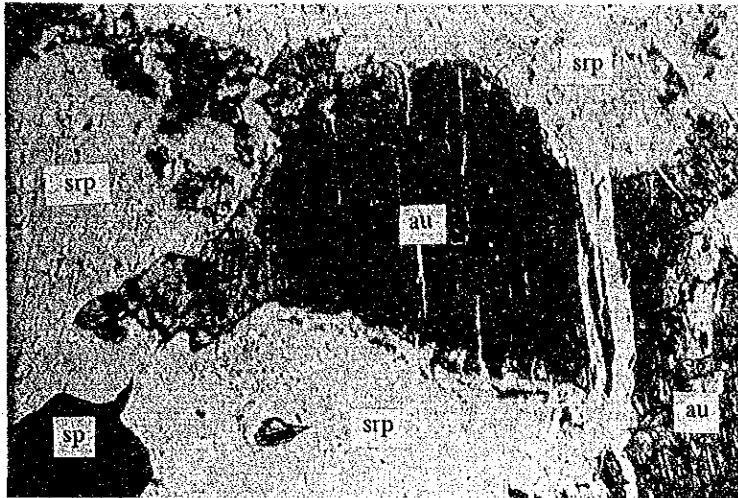
Only lower polar



Crossed polars

0 0.5mm

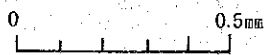
Sample No. : KR2-094  
Location : Baleta River  
Rock name : Harzburgite  
Group name : Ultramafic complex



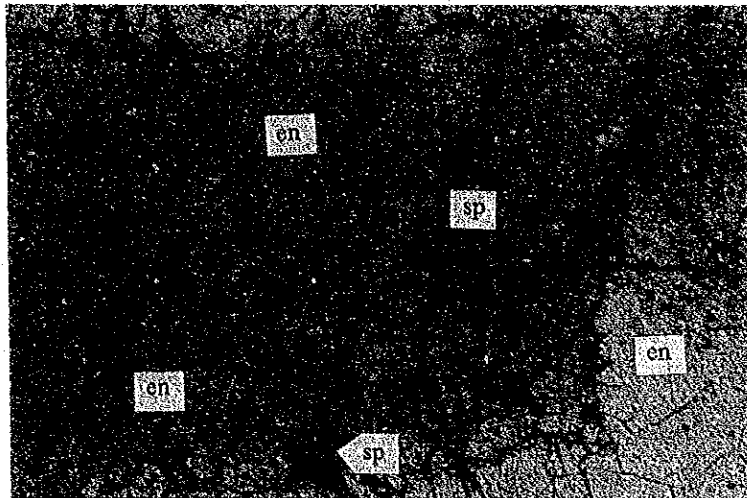
Only lower polar



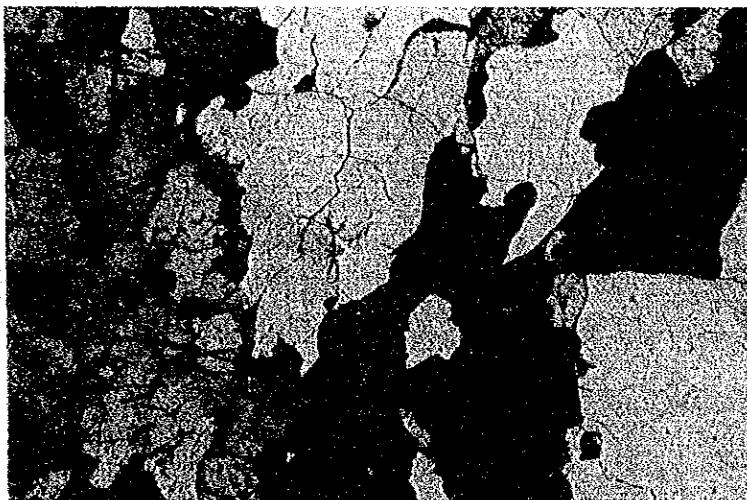
Crossed polars



Sample No. : KR2-095  
Location : Baleté River  
Rock name : Lherzolite  
Group name : Ultramafic complex



Only lower polar

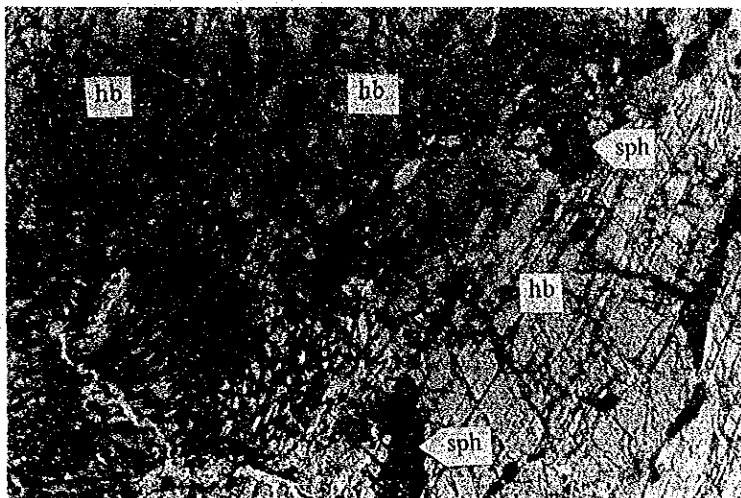


Crossed polars

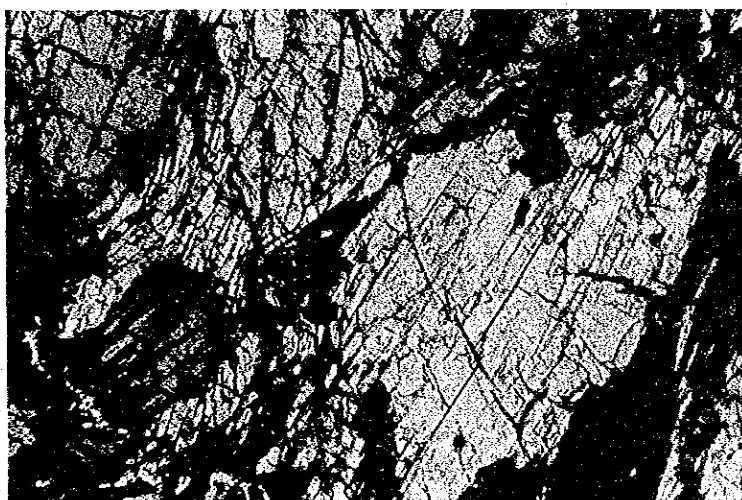


Sample No. : KR2-026  
Location : Pintin River  
Rock name : Orthopyroxenite  
Group name : Ultramafic complex





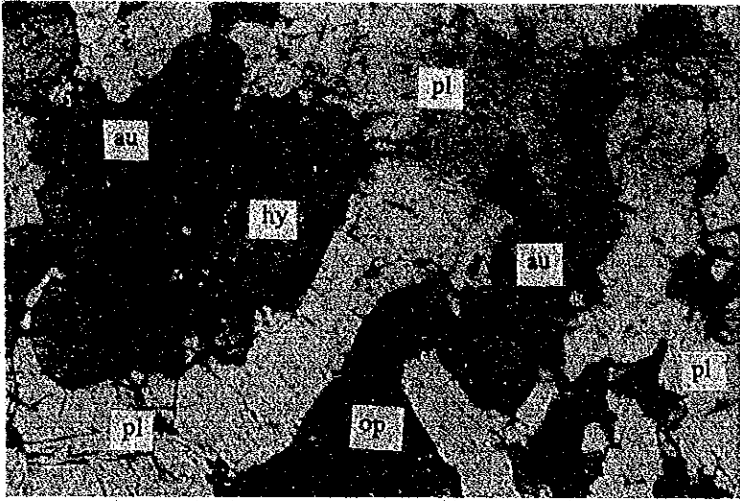
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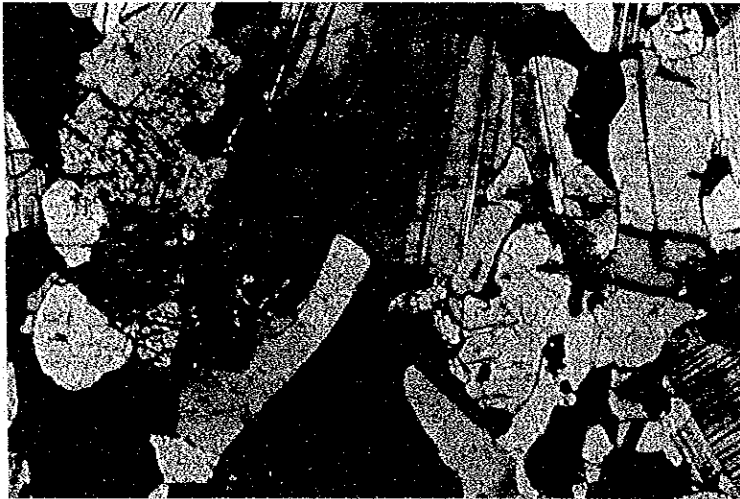
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0 0.5 mm

Sample No. : KR2-025  
Location : Pintin River  
Rock name : Hornblendite  
Group name : Ultramafic complex



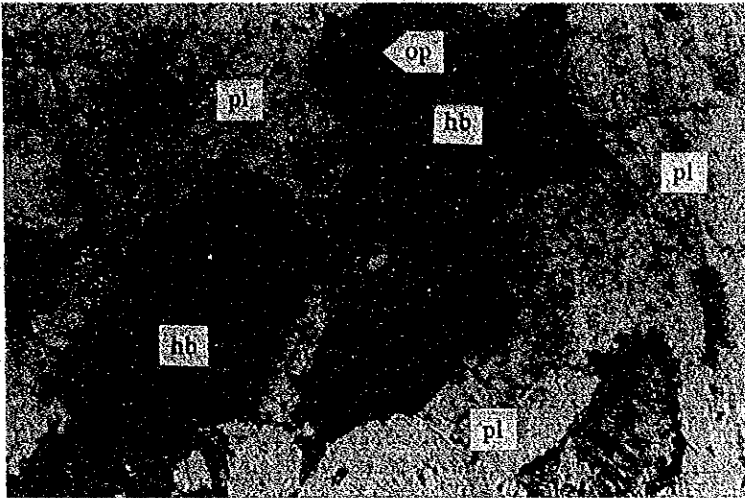
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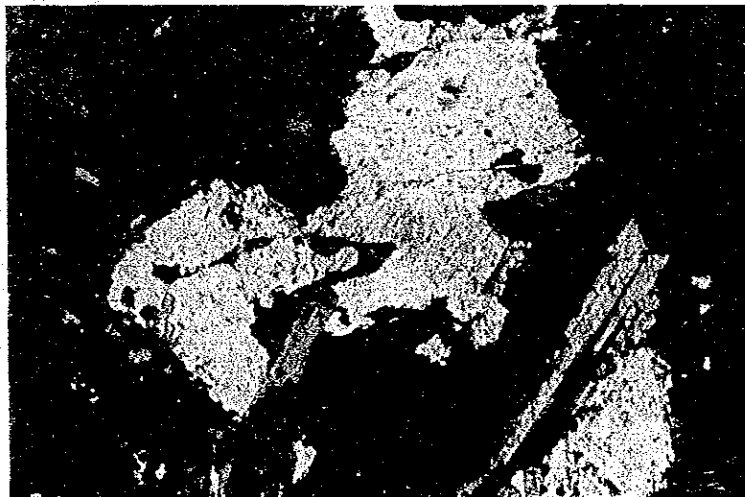
Crossed polars

0 0.5mm

Sample No. : KR2-030  
Location : Pintin River  
Rock name : au-hy gabbro  
Group name : Ultramafic complex

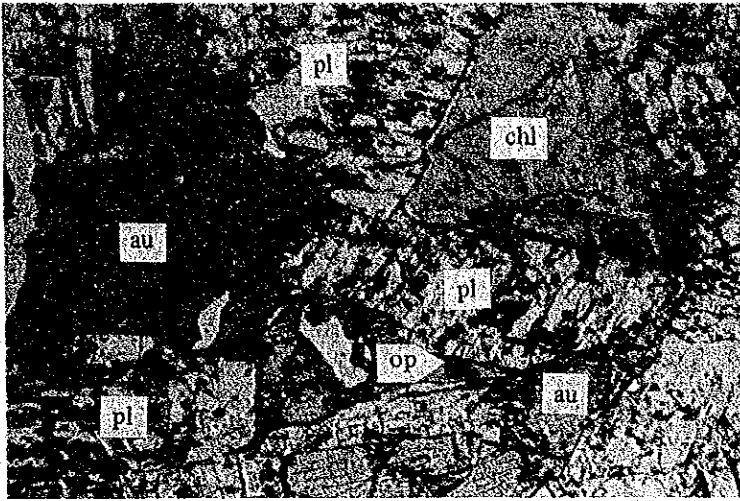


Only lower polar



Crossed polars

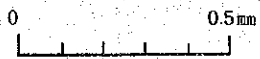
Sample No. : KR2-063  
Location : Igsoso  
Rock name : hb gabbro  
Group name : Ultramafic complex



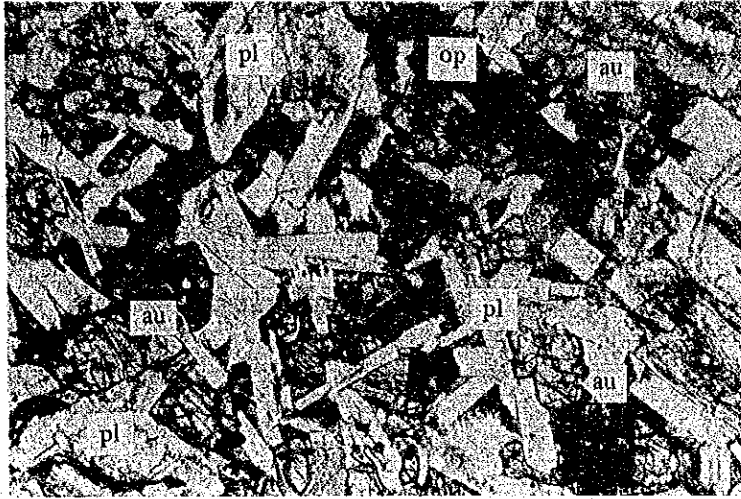
Only lower polar



Crossed polars



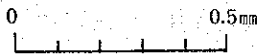
Sample No. : KR2-015  
Location : Lumintao River  
Rock name : au gabbro



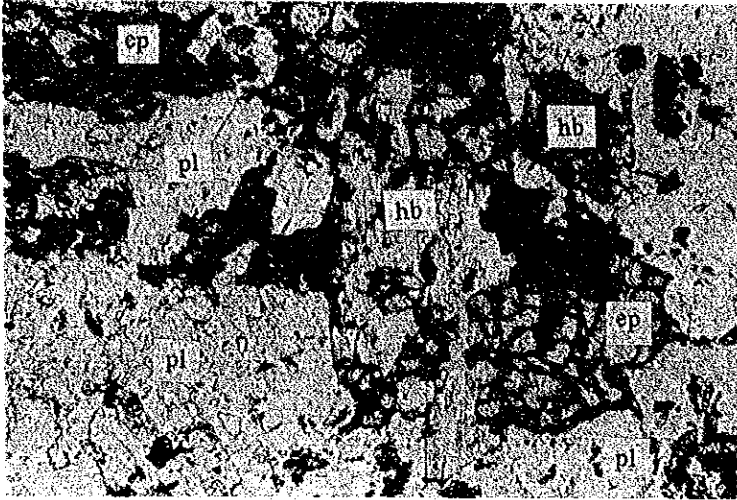
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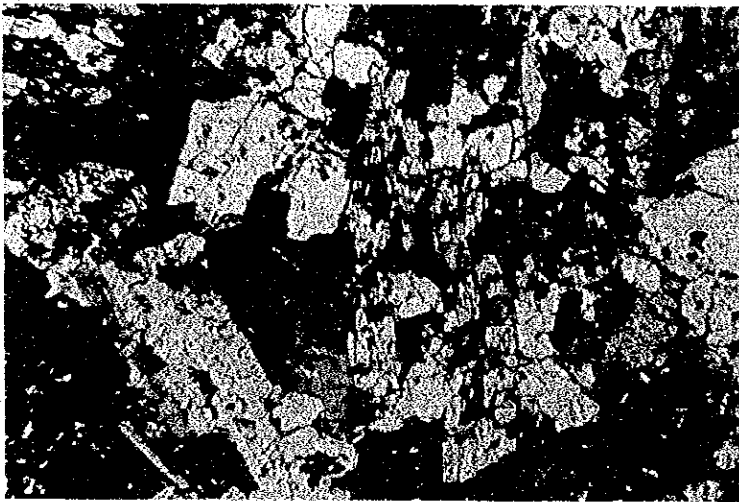
Crossed polars



Sample No. : KR2-011  
Location : Lumintao River  
Rock name : Dolerite



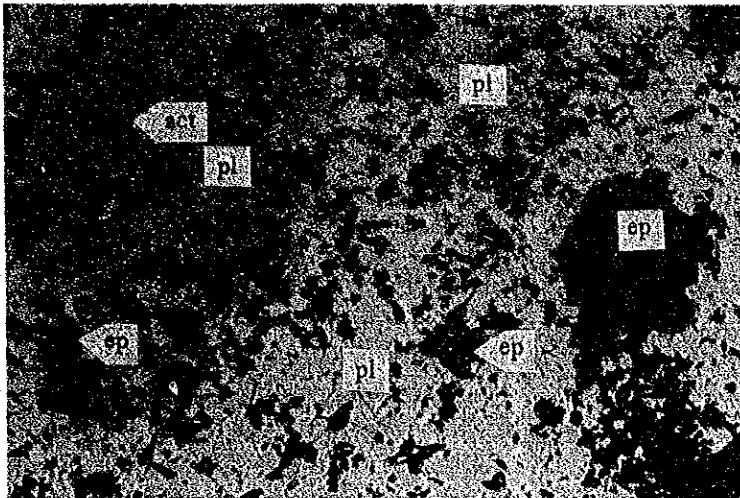
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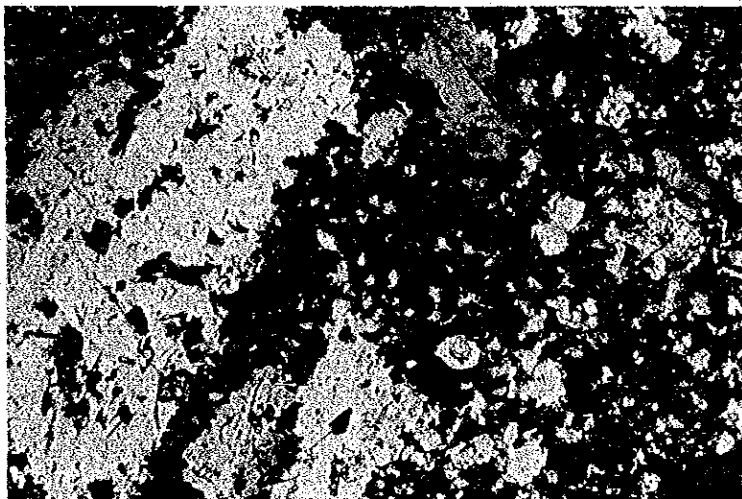
Crossed polars

0 0.5mm

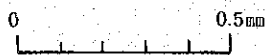
Sample No. : TR2-80  
Location : Mamburao River  
Rock name : hb diorite



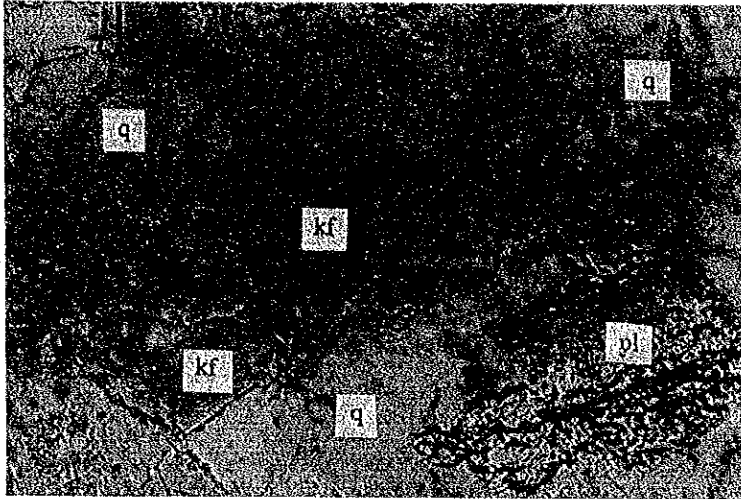
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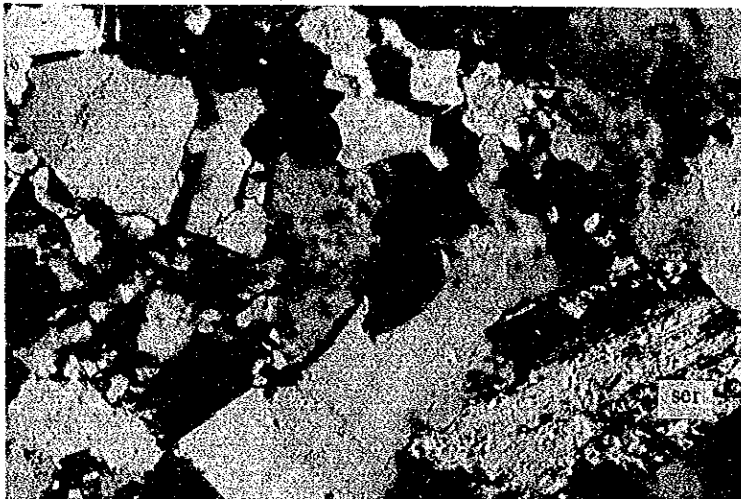
Crossed polars



Sample No. : TR2-83  
Location : Mamburao River  
Rock name : Diorite porphyry



Only lower polar



Crossed polars

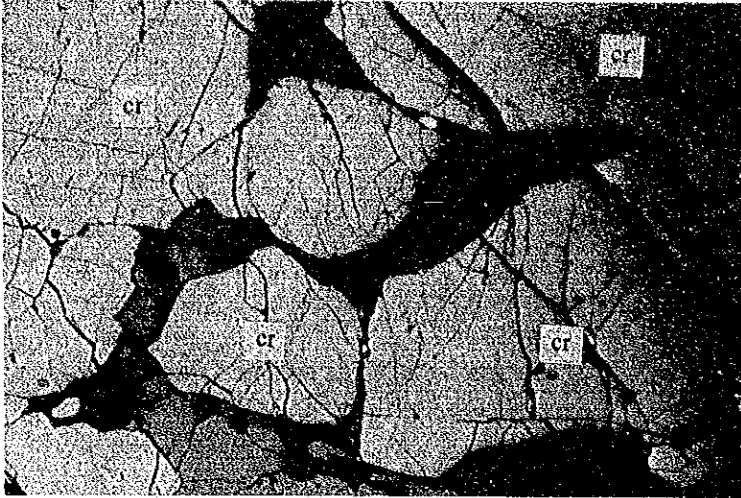
Sample No. : TR2-110  
Location : Mamburao River  
Rock name : q diorite



## Fig. A-2 Microphotograph of Polished Section

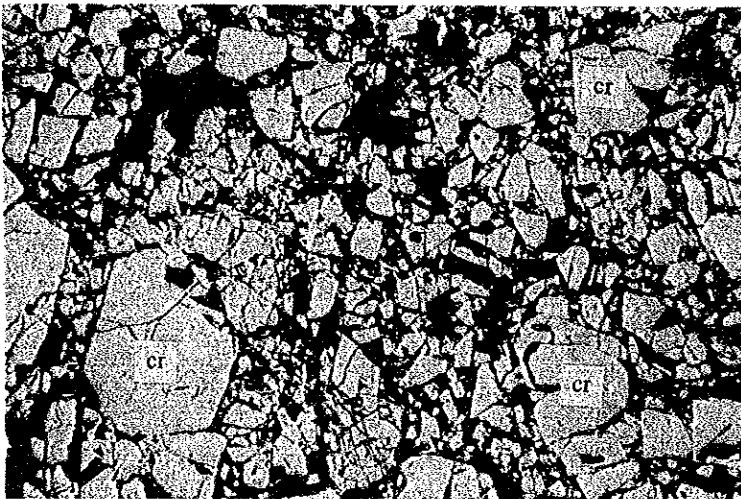
### Abbreviation

cr : chromite  
mg : magnetite  
he : hematite  
pyr : pyrrhotite  
cp : chalcopyrite  
sph : sphalerite  
py : pyrite



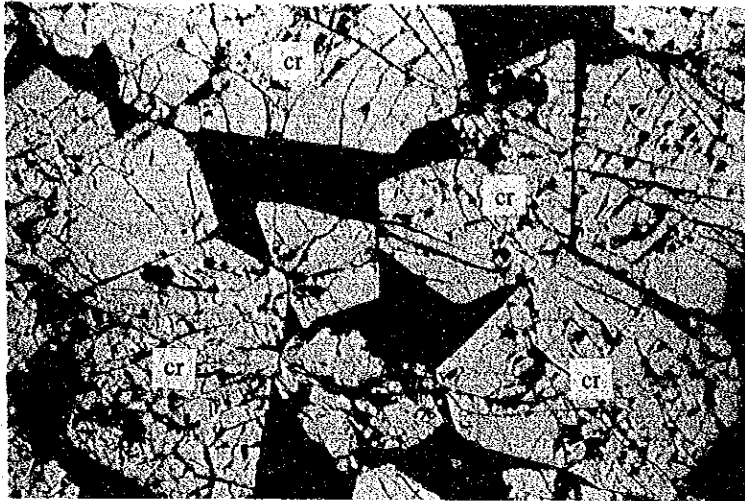
Sample No. : KR2-105a  
Location : Ogos deposit  
Ore name : chromite ore

Reflected light  
Only lower polar



Sample No. : TR2-130a  
Location : Banus deposit  
Ore name : chromite ore

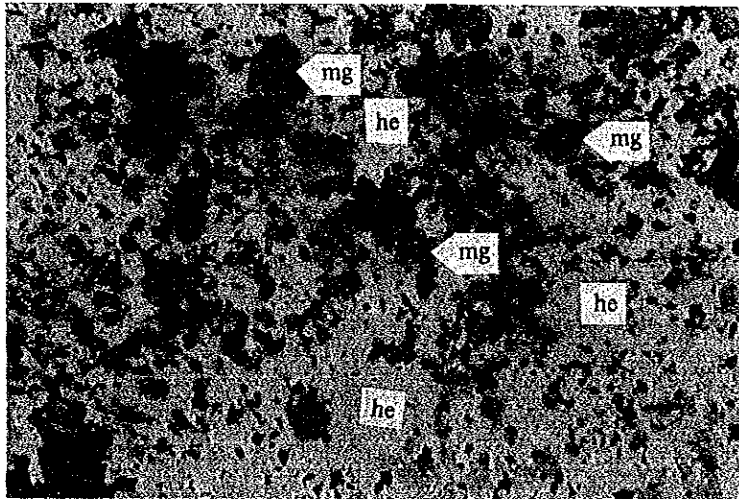
Reflected light  
Only lower polar



0 0.5 mm

Sample No. : KR2-050a  
Location : Pintin deposit  
Ore name : chromite ore

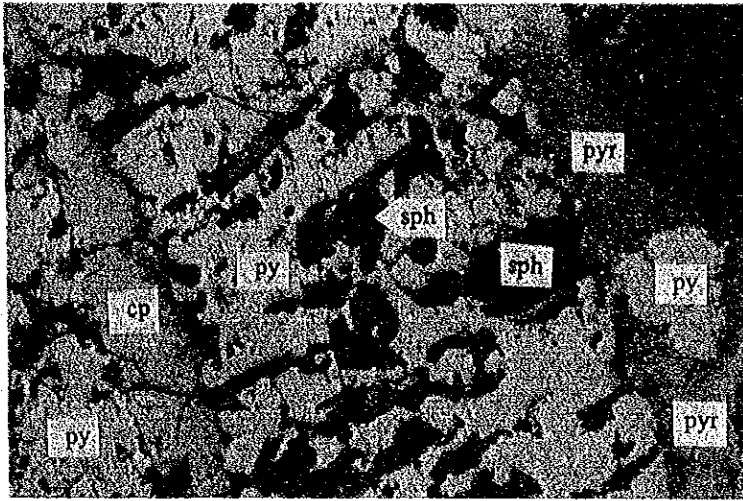
Reflected light  
Only lower polar



0 0.2 mm

Sample No. : TR2-093  
Location : Lasala deposit  
Ore name : hematite-magnetite ore

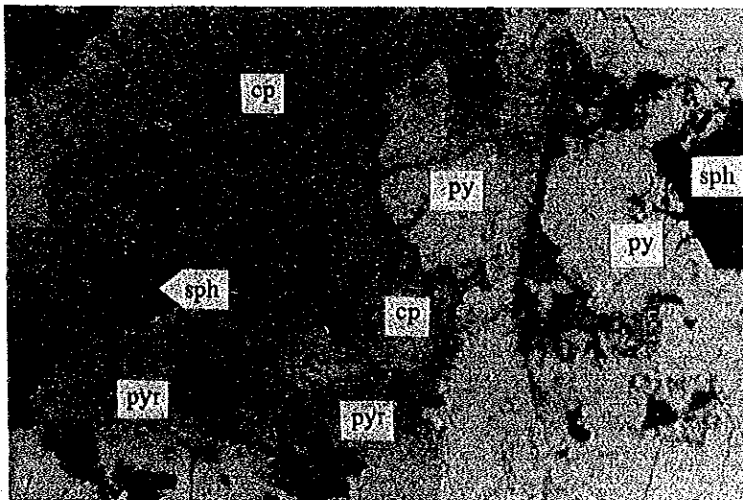
Reflected light  
Only lower polar



Sample No. : SR2-127a  
 Location : Masnon deposit  
 Ore name : chalcopyrite-pyrite  
 -pyrrhotite-sphalerite ore

Reflected light  
 Only lower polar

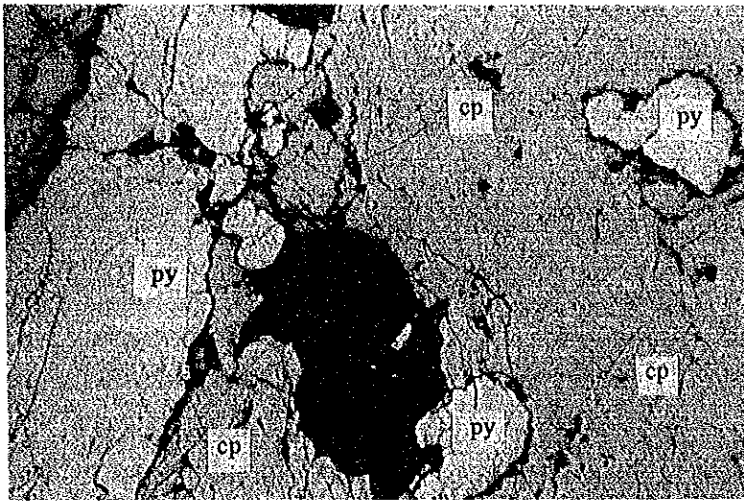
0 0.5mm



Sample No. : SR2-127b  
 Location : Masnon deposit  
 Ore name : pyrrhotite-pyrite  
 -sphalerite-chalcopyrite ore

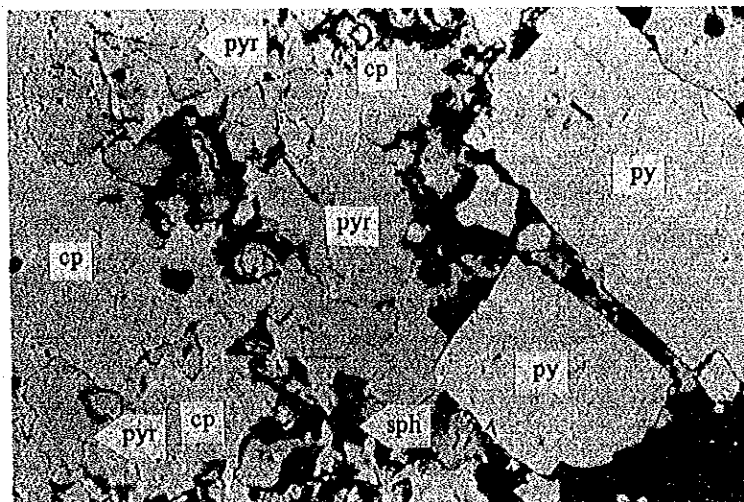
Reflected light  
 Only lower polar

0 0.2mm



Sample No. : SR2-136  
Location : Manamburao deposit  
Ore name : chalcopyrite-pyrite ore

Reflected light  
Only lower polar



Sample No. : FR2-024  
Location : Sibakoi River  
Ore name : pyrite-chalcopyrite  
pyrrhotite ore

Reflected light  
Only lower polar