Sample No.	Location	Macroscopic descriptions	Microscopic observations
R-253	Rio Blanco	ditto	Plagioclase shows marked zoning and twinning. Anhedral hornblende is weakly chloritized and epidotized. Feldspar is cloudy. granular sphene and opaque mineral are accessory.
R-254	Rio Blanco	Diorite porphyry	Diorite porphyry Porphyritic texture Phenocryst : Plagioclase, mafic mineral Euhedral~subhedral plagioclase (Max:2.5m/m) is filled with felsic minerals (calcite, sericite, potass feldspar). Mafic mineral is completely altered to calcite and epidote. Groundmass : It shows alteration to chlorite with sericite and felsic mineral. There are anhedral quartz and partly broken opaque mineral.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
V-1	La Verde	Coarse pyroxene basalt	Dolerite Ophitic texture It is composed mainly of augite and plagioclase. Phenocryst of augite (Dia:4.0∿0.3m/m) is partly replaced by plagioclase and shows zoning and hairglass structure. Fine granular (less than 0.1m/m) augite and opaque mineral lay intersertal in the laths of cloudy altered plagioclase (1.0∿0.1m/m). Pseudomorph of mafic mineral is replaced by fine aggregate of chlorite. Groundmass is filled with clay minerals.
V-5	La Verde	Altered hornblende basalt	Altered rock This rock is so strongly altered that it is difficult to make clear the original rock. Porphyritic or brecciated texture. Abundant of large hornblende crystal probably result from alteration of augite and moreover suffer from epidotization and chloritization. Plagioclase is calcitized and epidotized. Recrystallized matrix is composed of microcrystalline felsic mineral, chlorite and epidote.
V-8	La Verde	Altered pyroxene basalt	Altered dolerite Ophitic texture This rock is same as V-1, but alteration is more intensive than V-1. Phenocryst : Clinopyroxene and plagioclase. Clinopyroxene shows alteration to amphibole, calcite and chlorite. Plagioclase is also calcitized and sericitized. Groundmass : Aciculer amphibole aggregate and chlorite.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
V-9	La Verde	Porphyrite	Altered porphyrite Porphyritic texture Phenocryst : Plagioclase and mafic mineral (hornblende?) Plagioclase shows intense alteration to sericite and cloudy. Mafic mineral is completely altered to chlorite with opaque mineral. Groundmass : Primary plagioclase laths, granular opaque mineral, chlorite and recrystallized quartz. A little of epidote and calcite veins exisist.
V-15	La Verde	Calcareous sandstone	Calcareous sandstone Fragment : Acidic rock, chloritized andestic rock, sericitized rock, and quartz-calcitized organic materials. Matrix : Calcite, chlorite, fine felsic minerals and granular opaque mineral.
V-16	La Verde	Tuffaceous sandstone	Andesitic volcanic sandy tuff Fragment (less than 1.0m/m in size) : Andestic rock, clinopyroxene and plagioclase. Andestic fragment is mainly composed of acicular plagioclase and chlorite. Crushed clinopyroxene shows weak alteration to calcite and chlorite. Plagioclase is weakly sericitized and cloudy. Matrix : minute felsic mineral, chlorite, calcite and sericite.
V-17	La Verde	Calcareous shale	Calcareous shale Fragment (Max:0.2m/m) : Quartz, feldspar, calcitized organic fragment. Matrix : Granular calcite and a little microcrystalline mineral and opaque mineral. There are calcite or calcite and quartz veins.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
V-22	La Verde	Porphyritic granodiorite	Porphyritic granodiorite (weak porphyritic texture) Phenocryst : Plagioclase shows alteration to potass feldspar, chlorite and weak sericitization. Groundmass : Equigranular (ave:0.15m/m) quartz and potass feldspar and a little plagioclase. Mafic mineral is completely altered to chlorite and sericite or aggregation of chlorite and opaque mineral.
V-74	La Verde	Brecciated basalt	Brecciated basic rock Fragments of clinopyroxene, hornblende, plagioclase with a small amount of andestic rock (Max:2.0m/m), are mostly fresh. Matrix is composed of microcrystalline mineral, chlorite and opaque mineral.
D-2	La Verde	Altered diorite	Altered diorite Porphyritic texture Phenocryst : Plagioclase, hornblende and a little clinopyroxene. Plagioclase (Max:6.0m/m) shows alteration to sericite, epidote and chlorite. Hornblende marginally altered to epidote, chlorite and calcite. Groundmass : Sericitized plagioclase, recrystallized felsic minerals (Max:0.2m/m), and scattered opaque mineral. This rock shows intense alteration to epidote and locally formed epidote aggregate.
ND-1	Diamante	Altered andesite	Altered andesite Porphyritic texture? Phenocryst : Plagioclase, clinopyroxene (Max:6.0m/m) Plagioclase is almost altered to quartz and sericite. Clinopyroxene is completely altered to acicular aggregate of hornblende and sericite.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
ND-1	Diamante	ditto	Groundmass : Spherulitic part is consist of spherical crystal of acicular sericite, chlorite and quartz. The other part is consist of sericite, chlorite and felsic mineral.
ND-18	Diamante	Brecciated altered andesite	Andesitic tuff breccia Breccia : Andestic rock (Max:8.0m/m) rimmed with opaque mineral. Clinopyroxene is altered to secondary amphibole and sericite. Matrix : It consists of acicular sericite and microcrystalline minerals.
ND-33	Diamante	Altered andesite	Altered andesite Porphyritic texture Phenocryst : Clinopyroxene and plagioclase. Clinopyroxene shows alteration to amphibole and moreover sericite, chlorite or epidote. Plagioclase is also chloritized and cloudy. Groundmass : Laths of plagioclase and acicular sericite and chlorite with scattered and altered opaque mineral.
ND-52	Diamante	Granodiorite	Granodiorite Equigranular texture It consists mainly of plagioclase, quartz and mafic mineral with a small amount of potass feldspar. Plagioclase (Max:4.0m/m) shows weak alteration to subhedral potass feldspar and sericite. It shows marked zoning and twinning. Quartz (Max:3.0m/m) is anhedral. Mafic mineral is completely altered to aggregate of chlorite, calcite, sphene and opaque mineral. Anhedral potass feldspar occurs in marginal part of plagioclase and quartz.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
ND-53	Diamante	Altered andesite	Altered andesite Spherulitic texture Phenocryst : Plagioclase and mafic mineral. Plagioclase is altered to sericite and cloudy. Mafic mineral is completely altered to amphibole and suffer from sericitization, epidotization and chloritization. Spherulitic part (ave:0.5m/m, Max: 3.0m/m) is filled with chlorite, epidote and sericite. Groundmass : Acicular plagioclase. Sericite and chlorite result from alteration.
B-4	Bombona	Porphyritic granodiorite	Granodiorite Weak porphyritic texture It is composed of mainly hornblende, biotite, plagioclase, potass feldspar and quartz. Sphene, apatite and opaque mineral are accessory. Euhedral∿subhedral plagioclase (max:3.0m/m) shows marked zoning and albite twinning and sometimes changes amorphous state in the neuclei. Anhedral quartz (max:3.0m/m). Potass feldspar is closely associated with quartz and plagioclase and a part shows mirmekite texture. Biotite (max:3.0m/m) is platy and brownish color and changes into chlorite with minor amount of opaque mineral and sphene. Hornblende (max:2.0m/m) is green∿brownish green subhedral crystal with association of opaque mineral, sphene, epidote, apatite and biotite. Interstices of phenocryst are composed of fine grained (1.0∿0.1m/m) crystals.
B-5	Bombona	Chert	Silicified rock It is composed of fine grained (ave. 0.1m/m) quartz crystals which include epidote, sphene, hornblende and calcite (ave. 0.1m/m) in dotted form.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
B-10	Bombona	Granodiorite	Granodiorite equigranuler texture It consists mainly of biolite, hornblende, plagioclase, potass feldspar and quartz. Sphene, apatite and opaque mineral are accessory. Plagioclase (max:3.0m/m) is subhedral and shows marked zoning and twinning. Quartz (max:2.0m/m) and Potass feldspar (max:3.0m/m) are both anhedral crystal form which are surrounding plagioclase. Reddish brown platy biotite suffered from chloritization with opaque mineral. Hornblende (max:4.0m/m) partly changes into chlorite and biotite with association of opaque mineral.
B-11	Bombona	Granodiorite intruded by aplitic granite	Granodiorite It is composed mainly of plagioclase, anhedral quartz tabular biotite and a little potass feldspar. Epidote, sphene, apatite and opaque mineral are accessory. Plagioclase shows marked zoning and twinning. Aplitic granite vein It is composed mainly of quartz, patass feldspar, plagioclase and a little biotite. Felsic minerals are all anhedral. Tabular biotite (Max:0.7m/m) is chloritized. Near the contact, plagioclase is rich in the aplitic side and the other granodiorite side, quartz is abundant and that probably shows some reaction between those two rocks.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
B-20	Bombona	Granodiorite	Granodiorite It is composed mainly of subhedral plagioclase (Max: 1.5m/m), anhedral quartz, biotite and hornblende and a little potass feldspar. Sphene and opaque mineral are accessory. Tabular biotite (ave:0.5m/m) mostly shows alteration to chlorite. Hornblende (ave:0.5m/m, Max:2.0m/m) is replaced by plagioclase.
B-22	Bombona	Porphyritic granodiorite	Porphyritic granodiorite This rock is almost same as B-4, but grain size is a little coaser than that of B-4., felsic mineral (Max: 4.0m/m) and mafic mineral (Max:6.5m/m).

A. I -4 Microscopic Observation of the Polished Sections

Sample No.	Location	Macroscopic descriptions	Microscopic observations
R-107	Rio Blanco	Pyrite ore	This ore consists mainly of pyrite with a small amount of chalcopyrite, covelline, hematite and Fe-hydro-oxide. Pyrite shows anhedral form, and makes vein and dissemination, and partly margin of pyrite is replaced by Fe-oxide. Chalcopyrite, several decade μm to 100 μm in size, occurs as independent crystals but partly a small amount of chalcopyrite coexists with pyrite and margin of chalcopyrite is replaced by covelline.
R-110	Rio Blanco	Pyrite ore	This ore consists mainly of pyrite, with a small amount of chalcopyrite, covelline, hematite and Fe-hydro-oxide. Pyrite shows anhedral form, and makes vein and dissemination, and partly margin of pyrite is replaced by Fe-oxide. Chalcopyrite, several decade μm to 100 μm in size, occurs as independent crystals, but partly a small amount of chalcopyrite coexists with pyrite and margin of chalcopyrite is replaced by covelline.
ND-13	Diamante	Arsenopyrite ore	This ore consists mainly of arsenopyrite, pyrite, and sphalerite, with a small amount of chalcopyrite, covelline, and galena. Arsenopyrite shows euhedral and anhedral form, the others show anhedral form. Sphalerite includes chalcopyrite dots. Galena is several decade μm to 100 μm in size, and is included in arsenopyrite.
ND-17	Diamante	Pyrite-arsenopyrite ore	This ore consists mainly of pyrite and arsenopyrite, and a small amount of sphalerite, chalcopyrite, galena and a few dot of electrum. Electrum is 10 to 70 μm in size, occurs in pyrite, intergranular of pyrite and/or in gangue minerals. Sphalerite includes a few dot of chalcopyrite. Margin of galena in part is replaced by chalcocite.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
ND-42	Diamante	Arsenopyrite-pyrite ore	The constituent minerals are mainly arsenopyrite and pyrite with accessory sphalerite, chalcopyrite, galena and a few dot of electrum. Electrum is 10 to 50 μm in size, coexists with pyrite, but often occurs in gangue minerals. Sphalerite includes chalcopyrite dot. Chalcopyrite is replaced by chalcocite and covelline in part.
ND-46	Diamante	Pyrite-chalcopyrite-hematite ore	It is composed mainly of pyrite, chalcopyrite and hematite, with accessory covelline and hydro-oxide, these minerals fill the interstice of gangue minerals and the cracks. Covelline, hematite & Fe-hydro-oxide occur the margin of chalcopyrite and pyrite by weathering.
ND-49	Diamante	Pyrite ore	This ore consists mainly of pyrite, with a small amount of arsenopyrite, sphalerite, galena, chalcopyrite, boulangerite?, tetrahedrite, and covelline. Boulangerite occurs the margin of galena. Boulangerite? tetraherite, galena, and covelline coexist complicatedly.
D-SP-1	Diamante	Pyrite ore	It is composed mainly of pyrite, with a small amount of arsenopyrite and chalcopyrite. Chalcocite is observed at a margin of chalcopyrite and along the cracks in part. Chalcopyrite includes tetrahedrite (100 μm). Pyrite is partly replaced by marcasite.
D-SP-2	Diamante	Pyrite ore	It is composed mainly of pyrite, with a small amount of arsenopyrite and sphalerite, and a very small amount of chalcopyrite, tetrahedrite and galena. Tetrahedrite cuts pyrite and arsenopyrite, and often coexists with chalcopyrite. Sphalerite includes chalcopyrite dots.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
OD-A	Diamante	Arsenopyrite ore	It is composed mainly of arsenoprite, with a small amount of sphalerite, and a very small amount of chalcopyrite. Sphalerite includes chalcopyrite dots.
OD-B	Diamante	Arsenopyrite-sphalerite ore	The constituent minerals are arsenopyrite and sphalerite, with a small amount of pyrite, galena and chalcopyrite, and a very small amount of tetrahedrite. Sphalerite includes chalcopyrite dots.
OD-C	Diamante	Pyrite ore	It is composed mainly of pyrite, with a small amount of arsenopyrite, sphalerite and galena. Electrum of 20 to 30 μm in size is observed in pyrite. Sphalerite includes chalcopyrite dots.

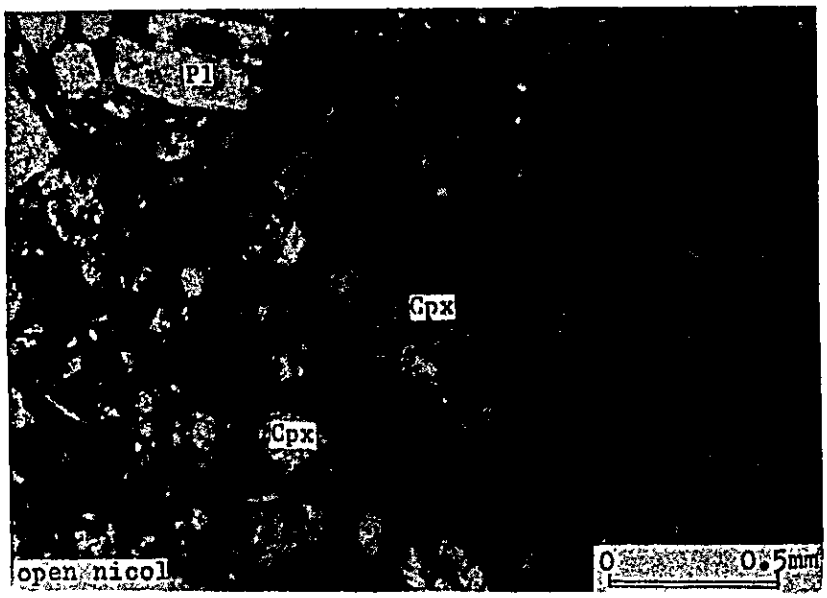
A. I-5 Photomicrographs

A. I-5-1 Thin Sections

Sample No.	Location	Rock Type
R - 34	Rio Blanco	Tuffaceous volcanic sandstone
R -118	Rio Blanco	Hornblende diorite porphyry
R -138	Rio Blanco	Granodiorite porphyry
R -238	Rio Blanco	Recrystallized rock
R -242	Rio Blanco	Alternation of shale and sandstone
V - 1	La Verde	Dolerite
V - 15	La Verde	Calcareous sandstone
V - 16	La Verde	Andesitic volcanic sandy tuff
V - 17	La Verde	Calcareous shale
V - 22	La Verde	Porphyritic granodiorite
ND- 1	Diamante	Altered andesite
ND- 18	Diamante	Andesitic tuff breccia
ND- 53	Diamante	Altered andesite
B - 4	Bombona	Granodiorite
B - 5	Bombona	Silicified rock

Abbreviations

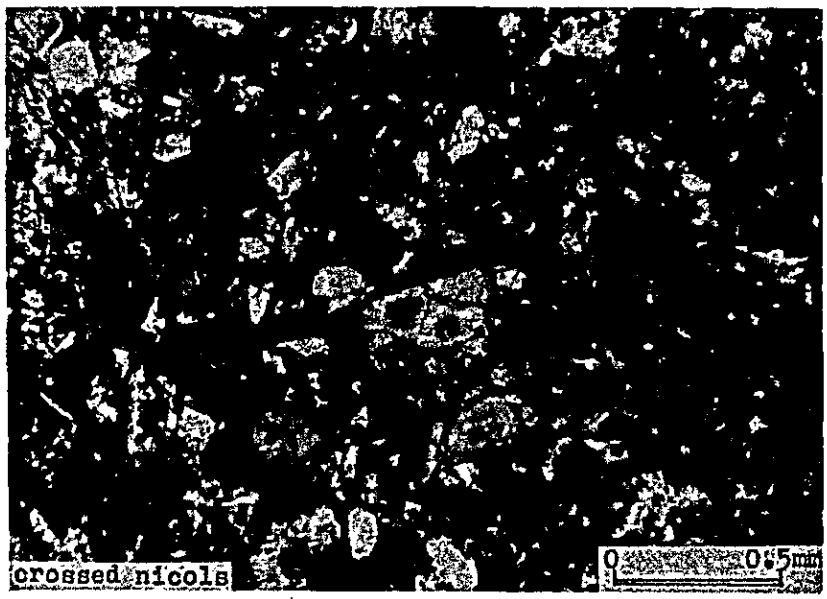
Pl : Plagioclase
Qz : Quartz
Ser : Sericite
Chl : Chlorite
Hb : Hornblende
Bio : Biotite
Cpx : Clinopyroxene
Cal : Calcite
Ep : Epidote
Or : Orthoclase

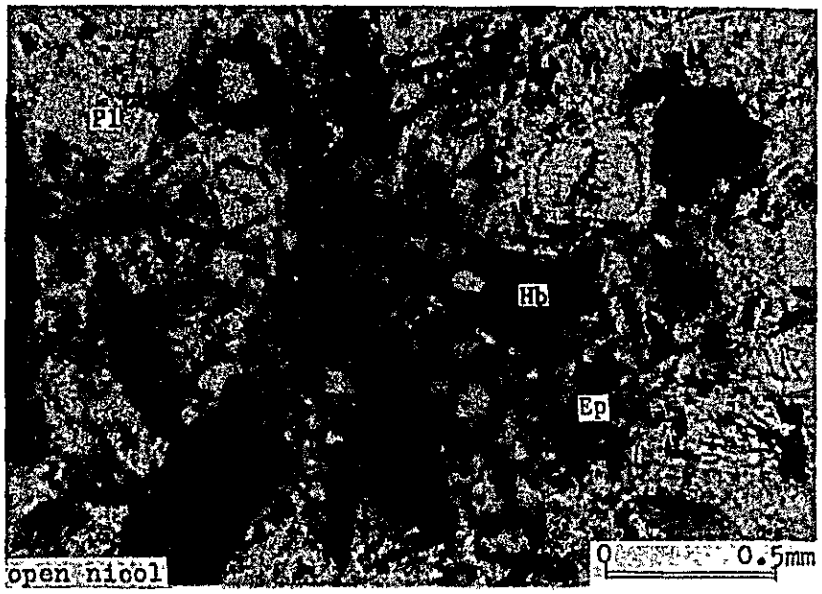


Sample No. R-34

Rock type:

Tuffaceous volcanic sandstone

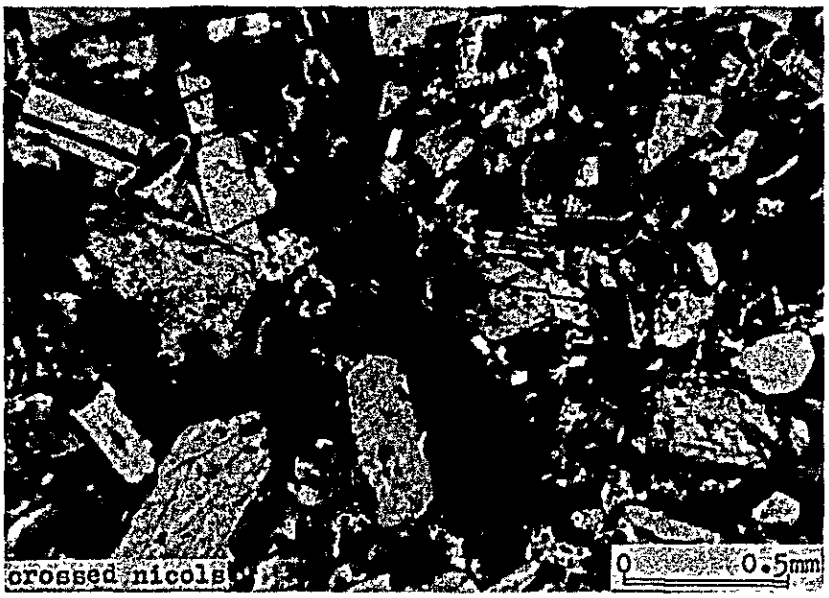


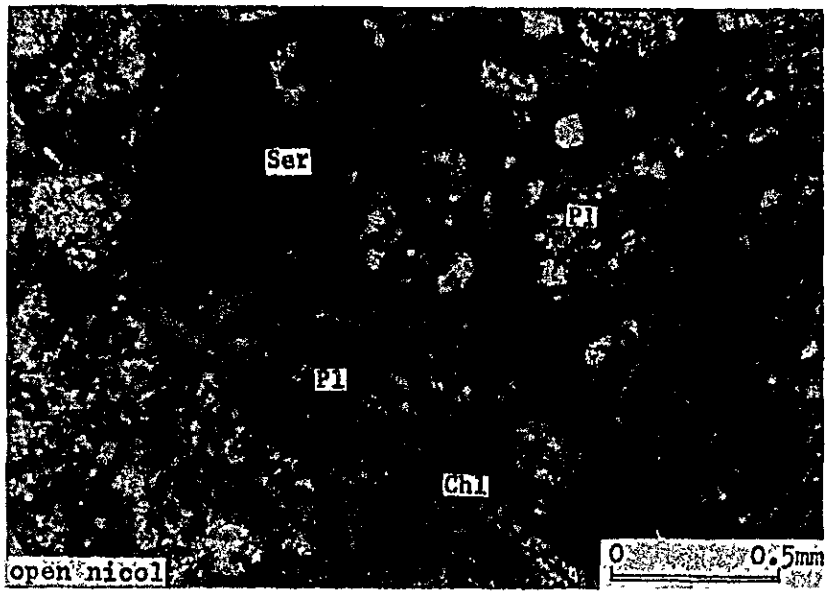


Sample No. R-118

Rock type:

Hornblende diorite porphyry

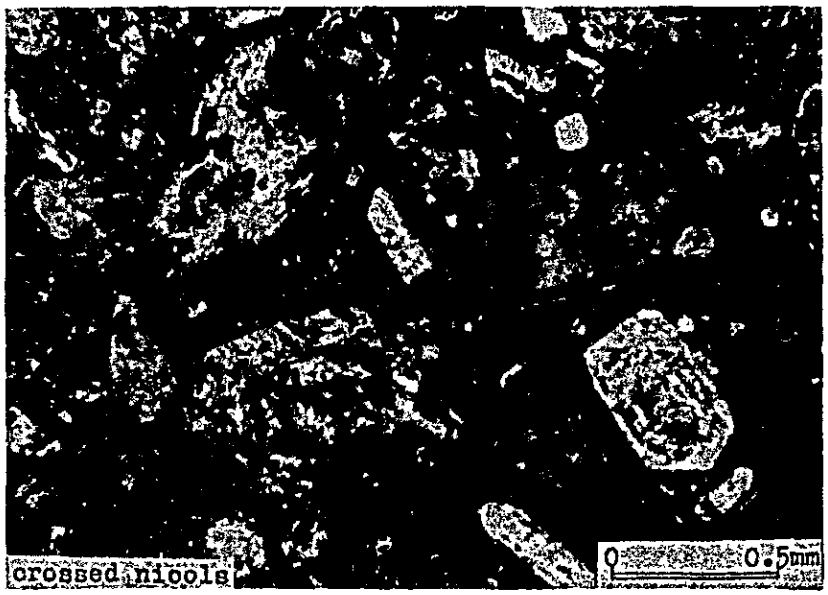


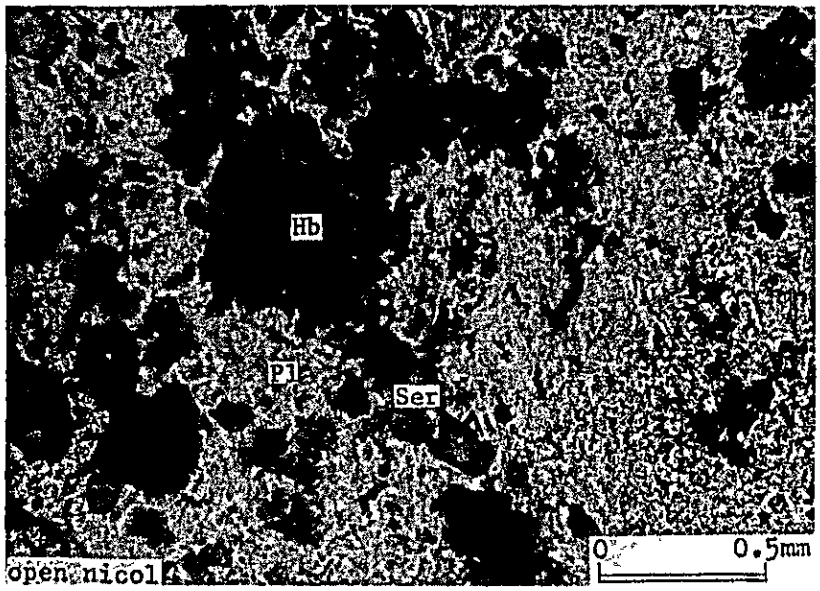


Sample No. R-138

Rock type:

Granodiorite porphyry

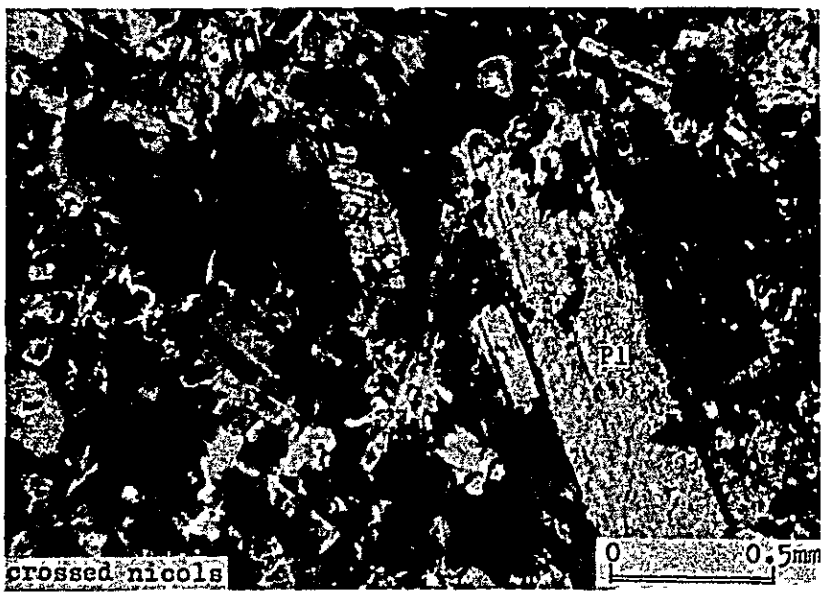


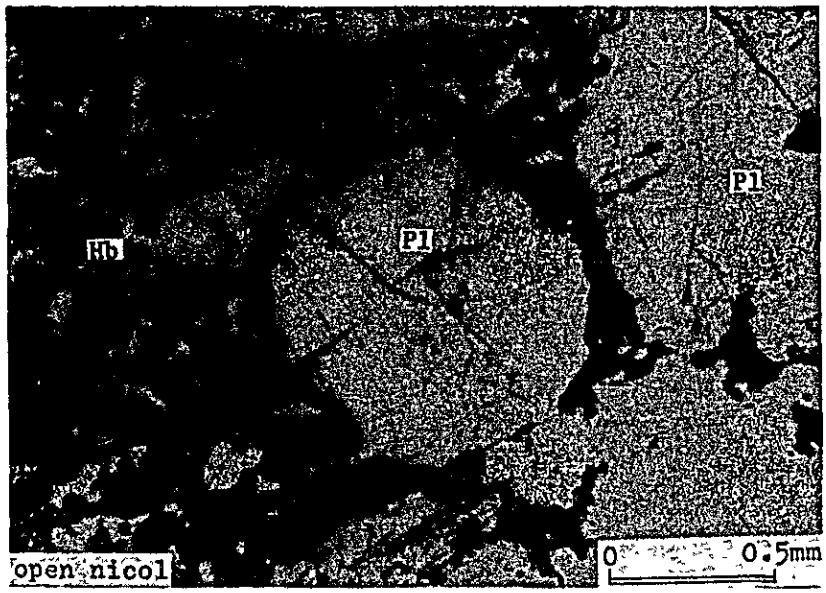


Sample No. R-238

Rock type:

Recrystallized rock

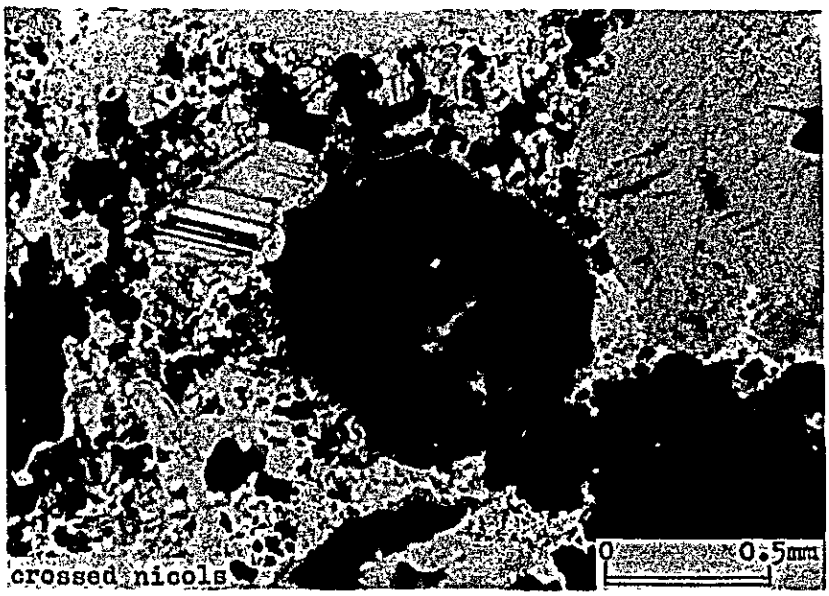


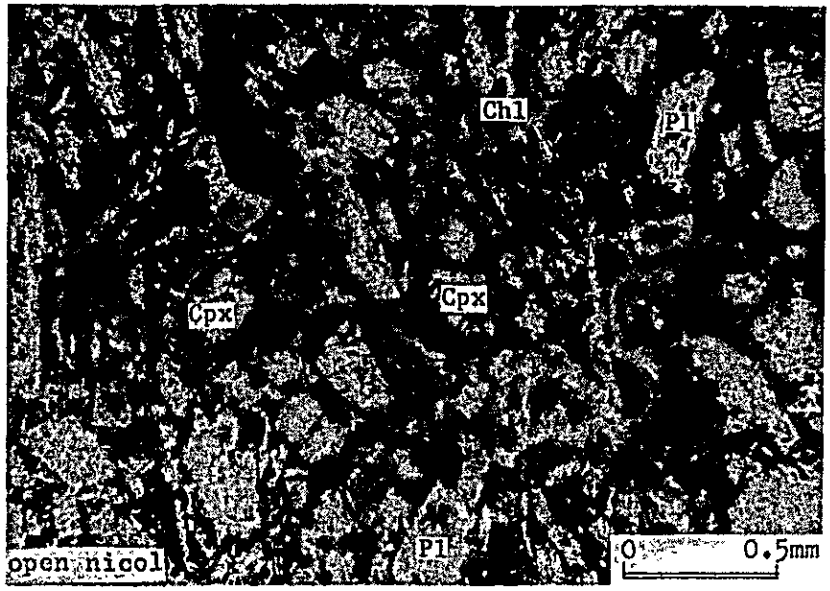


Sample No. R-242

Rock type:

Shale/sandstone

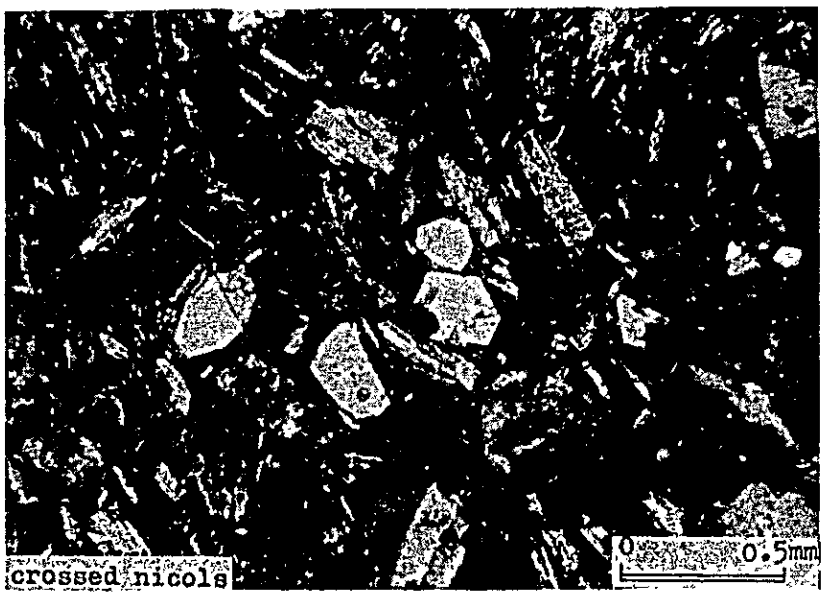


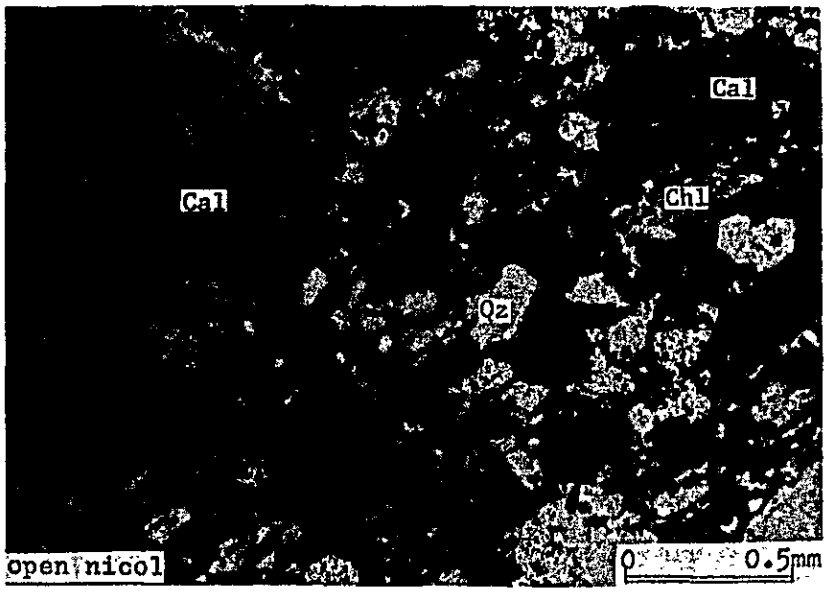


Sample No. V-1

Rock type:

Dolerite

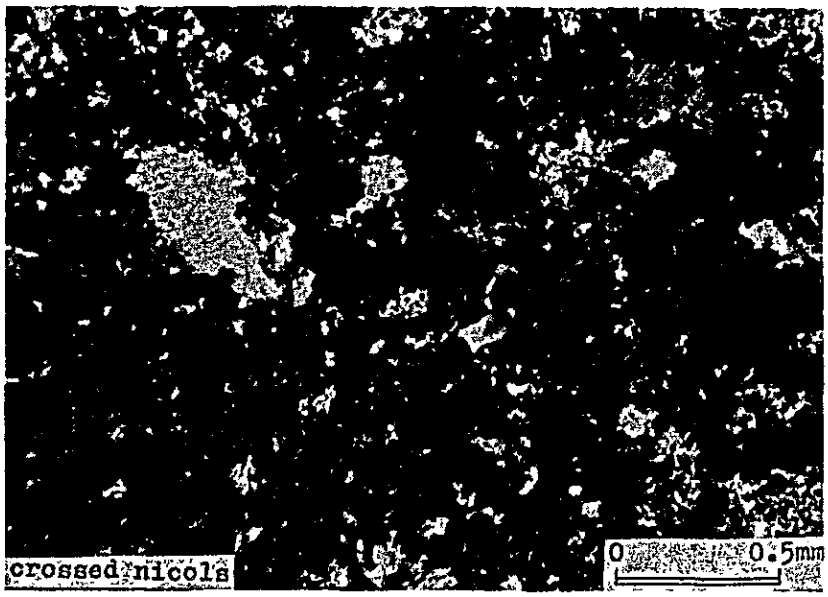


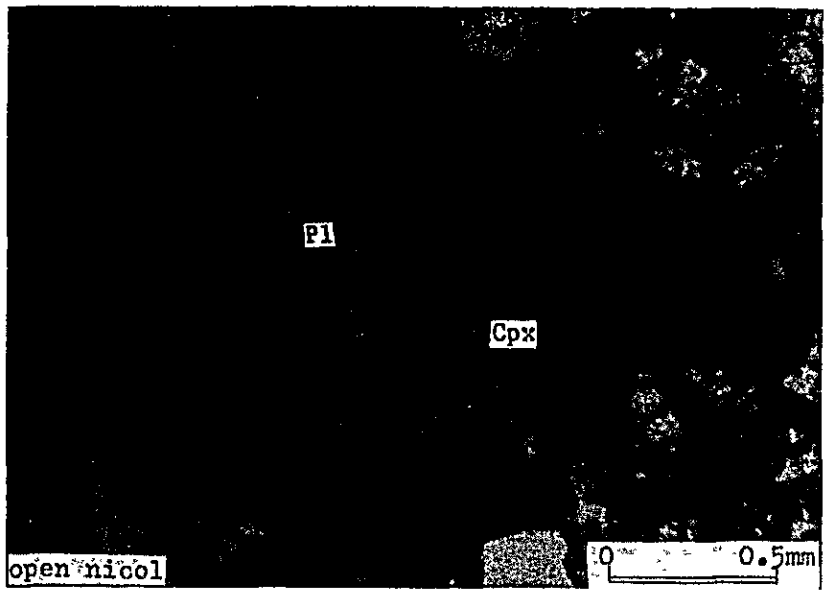


Sample No. V-15

Rock type:

Calcareous sandstone





Sample No. V-16

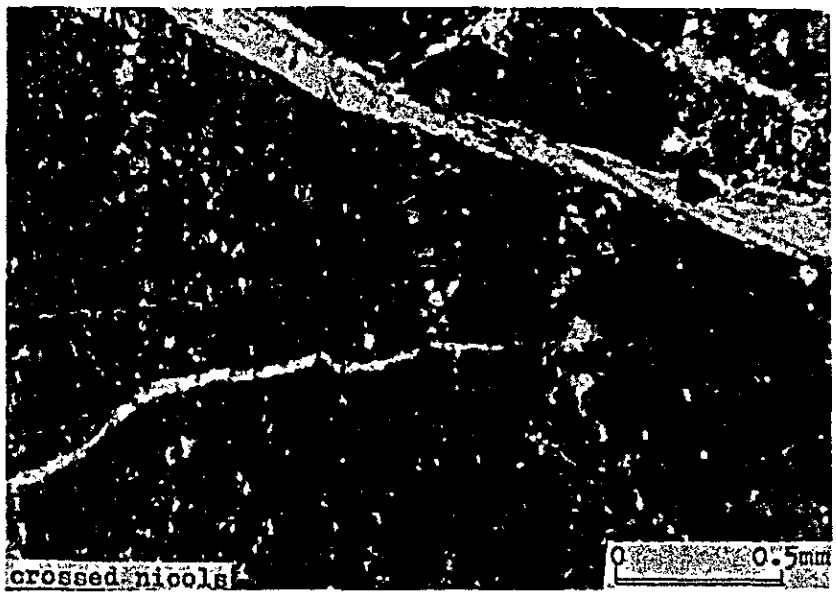
Rock type:

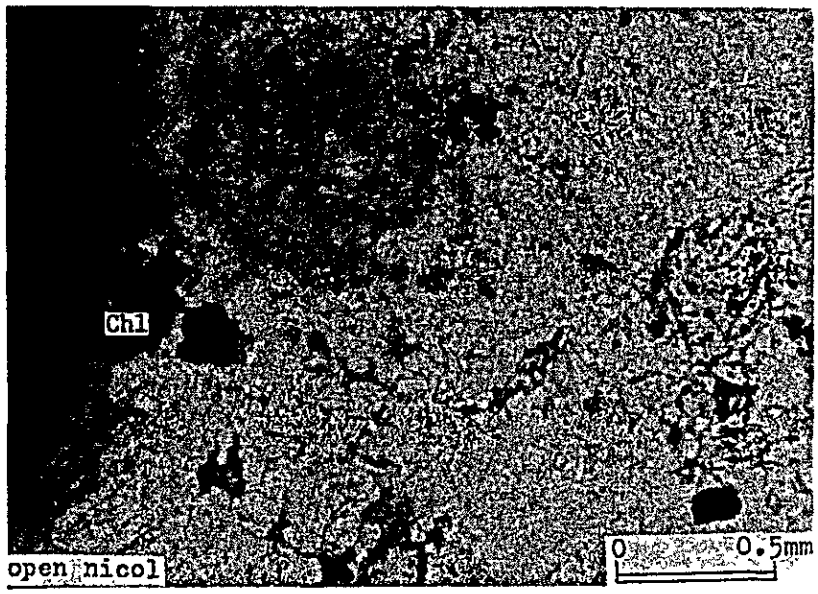
Andesitic volcanic sandy tuff

Sample No. V-17

Rock type:

Calcareous shale

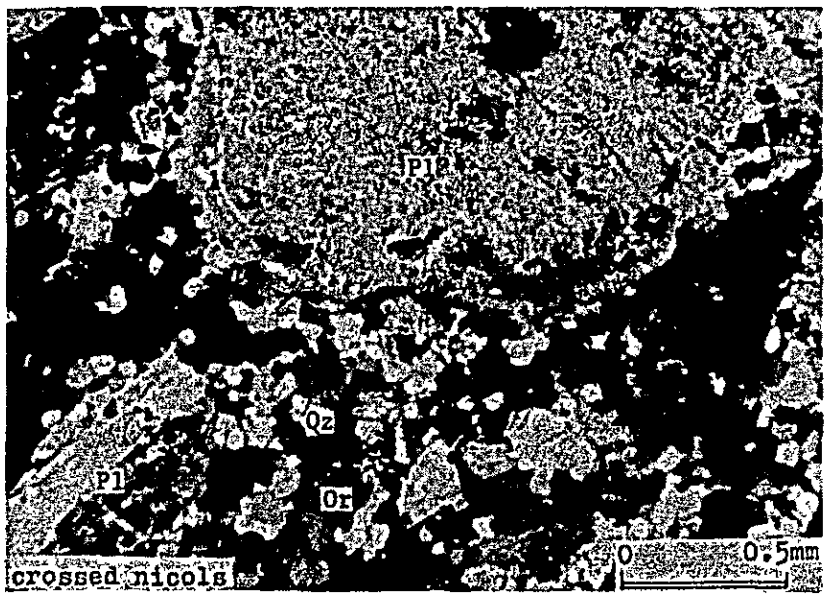




Sample No. V-22

Rock type:

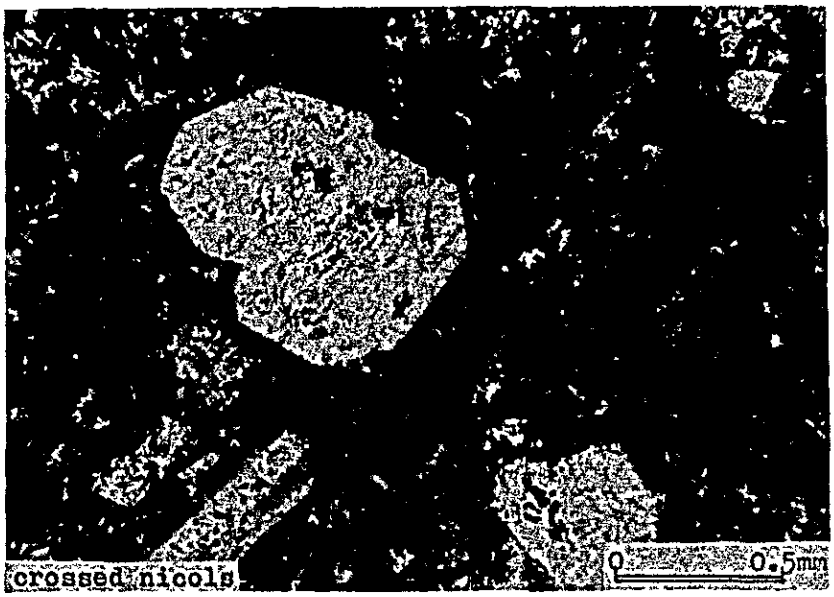
Porphyritic granodiorite

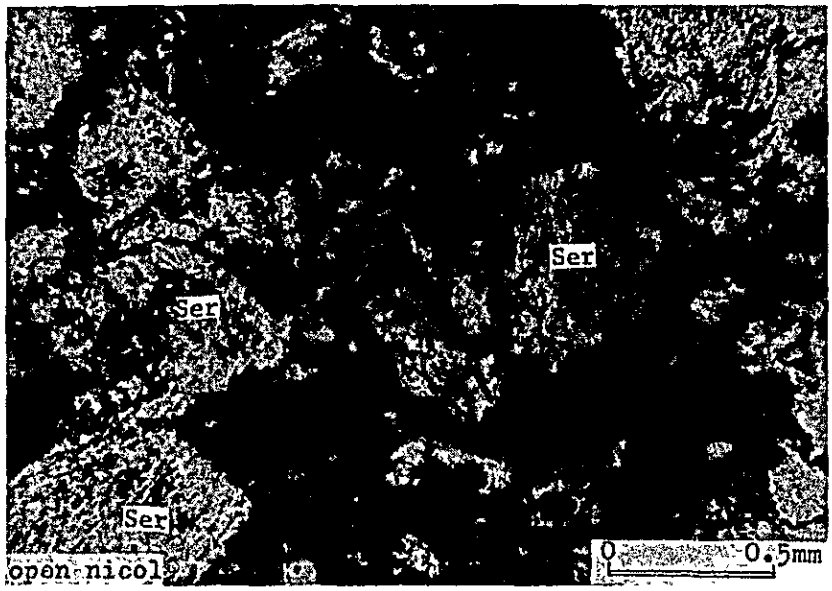


Sample No. ND-1

Rock type:

Altered andesite

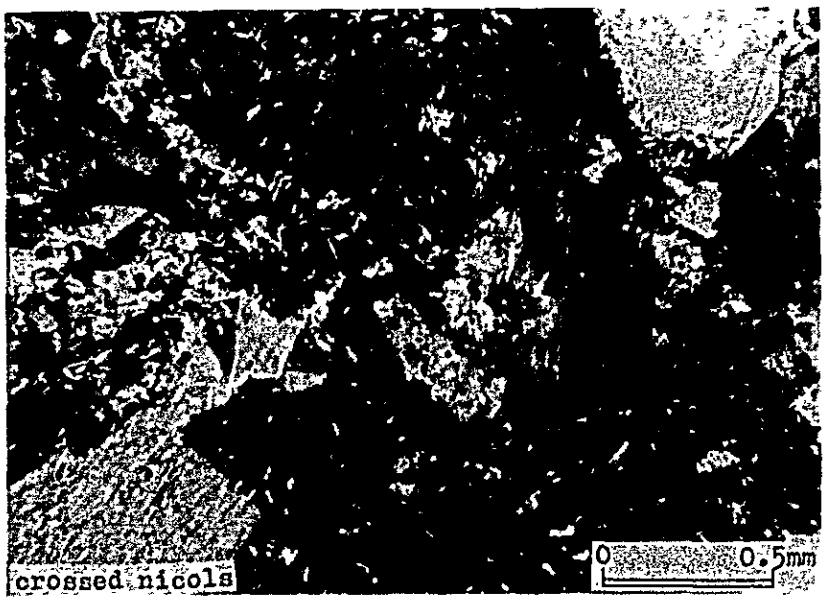


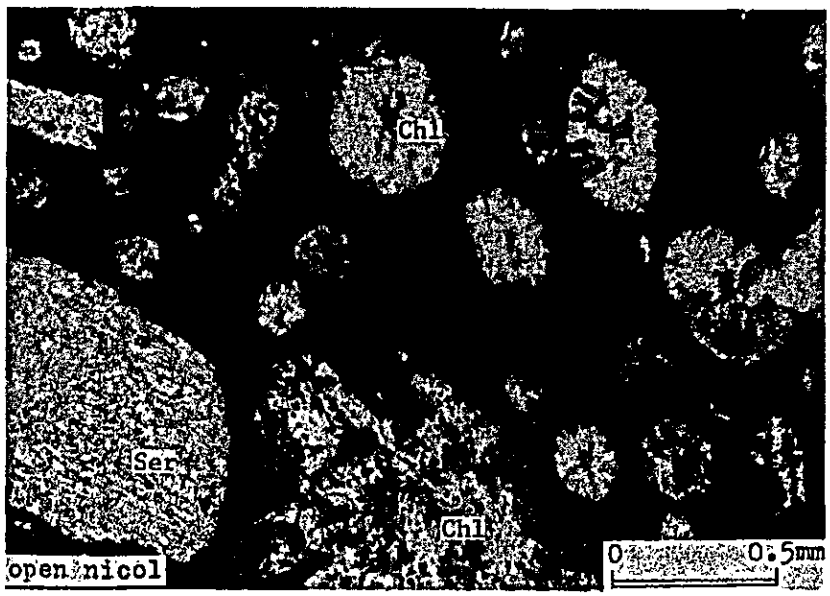


Sample No. ND-18

Rock type:

Andesitic tuff breccia

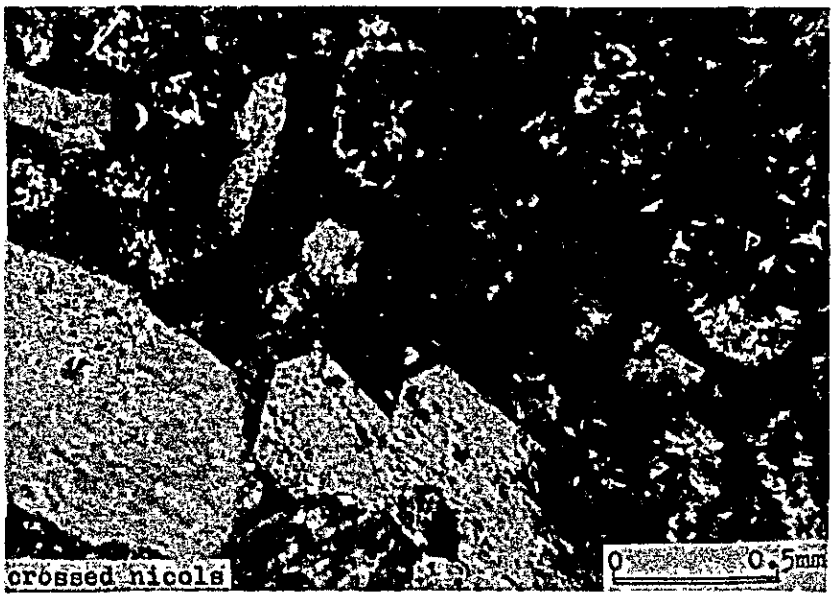


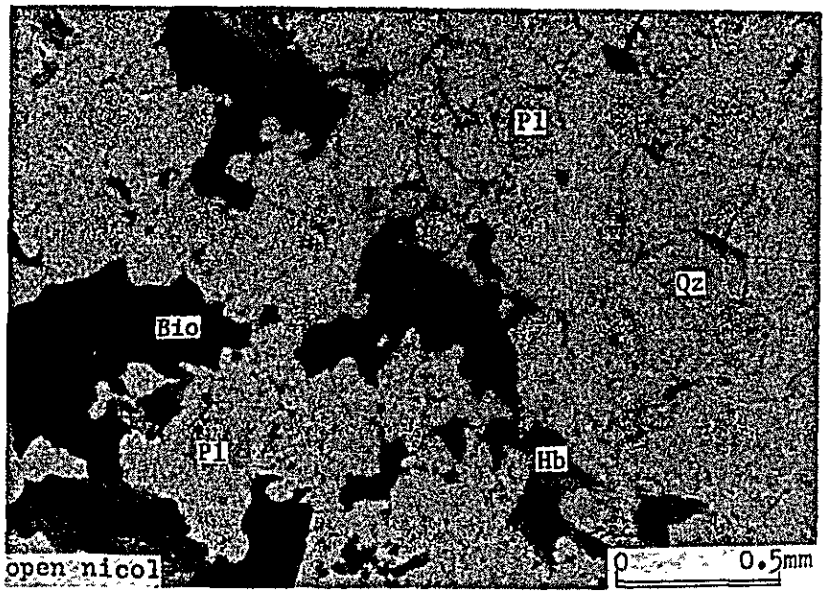


Sample No. ND-53

Rock type:

Altered andesite

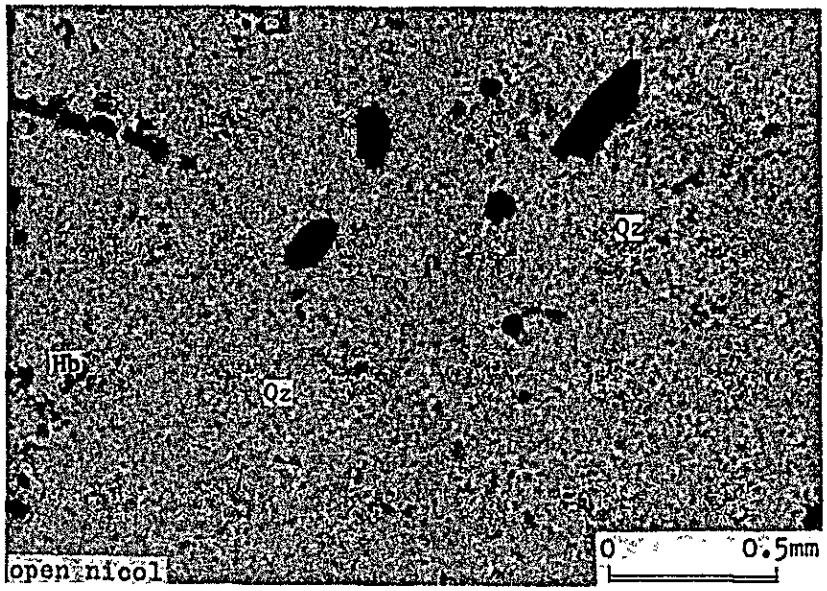




Sample No. B-4

Rock type:

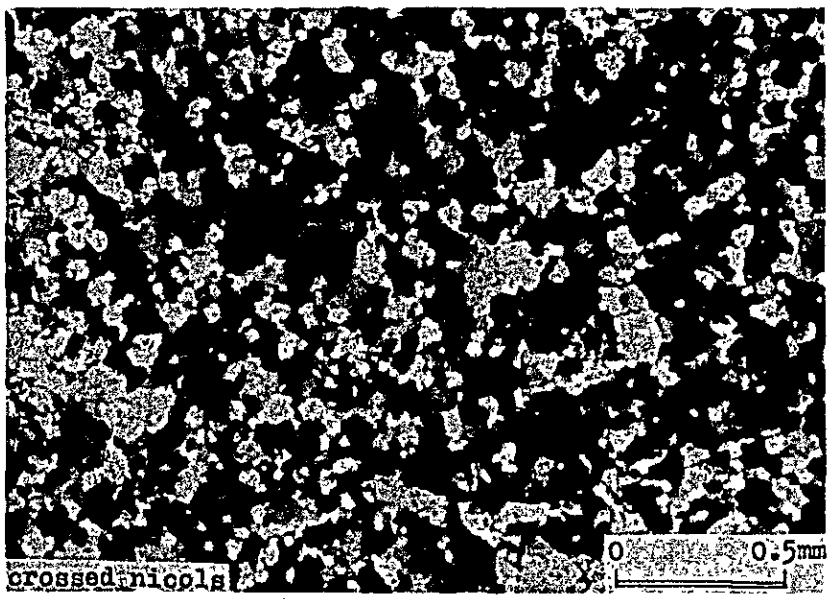
Granodiorite



Sample No. B-5

Rock type:

Silicified rock

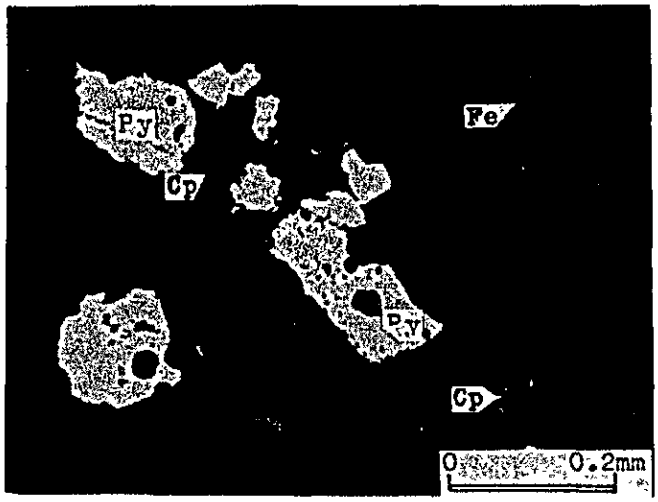


A. I -5-2 Polished Sections

Sample No.	Location	Rock Type
R-107	Rio Blanco	Copper ore
ND-13(C)	Diamante	Zinc, copper ore
ND-17	Diamante	Gold ore
ND-46(A)	Diamante	Copper ore
ND-46(B)	Diamante	Copper ore
ND-49	Diamante	Copper, zinc, lead ore
D-Sp-2	Diamante	Copper, zinc, lead ore
OD-B	Diamante	Copper, zinc, lead ore
OD-C	Diamante	Gold ore

Abbreviations

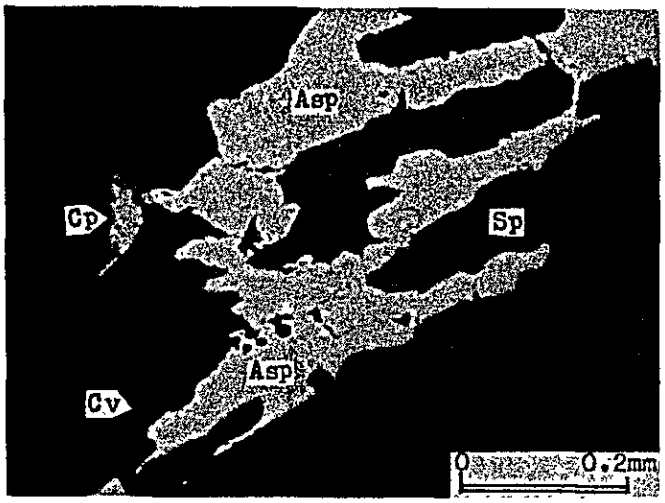
Py : Pyrite
Asp : Arsenopyrite
El : Electrum
Cp : Chalcopyrite
Sp : Sphalerite
Gn : Galena
Fe : Iron oxide
Cv : Covelline
Hem : Hematite
Cc : Chalcocite
Bl : Boulangerite
Td : Tetrahedrite
G : Gangue mineral



Sample No. R-107

Rock type:

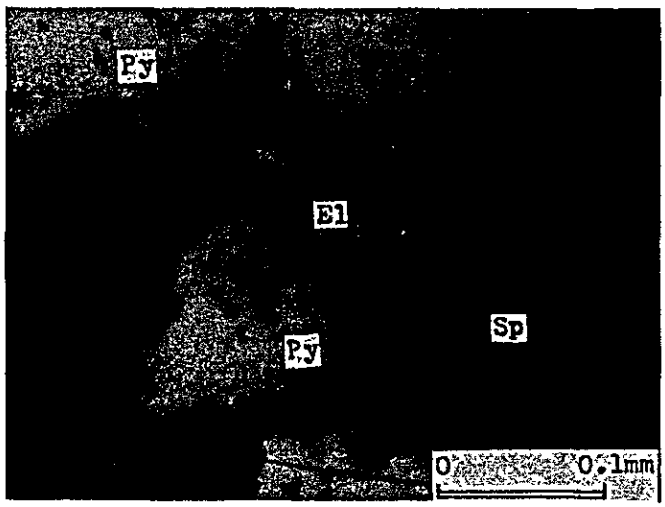
Copper ore



Sample No. ND-13(C)

Rock type:

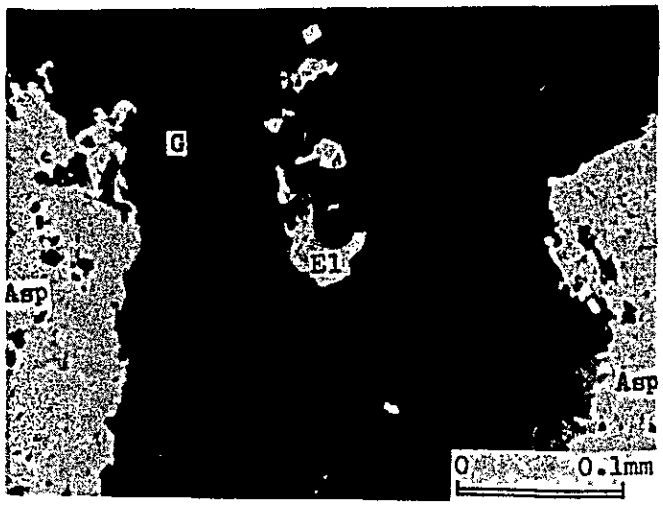
Zinc, copper ore



Sample No. ND-17

Rock type:

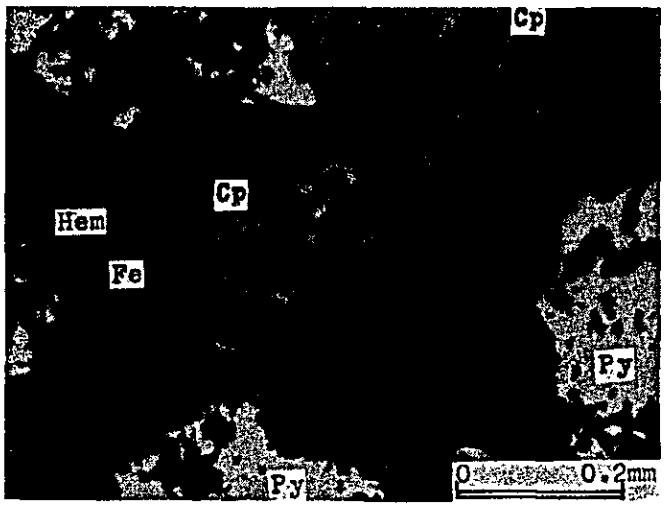
Gold ore



Sample No. ND-17

Rock type:

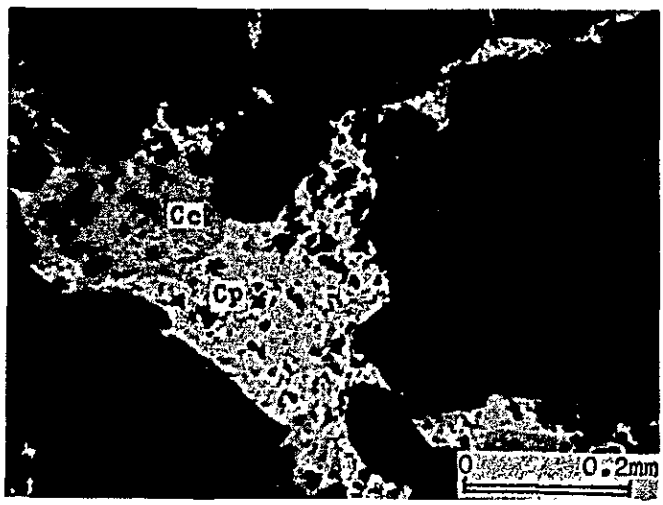
Gold ore



Sample No. ND-46(A)

Rock type:

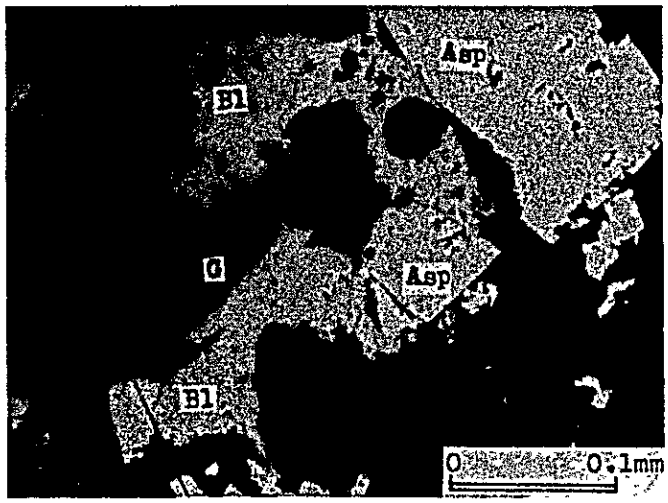
Copper ore



Sample No. ND-46(B)

Rock type:

Copper ore



Sample No. ND-49

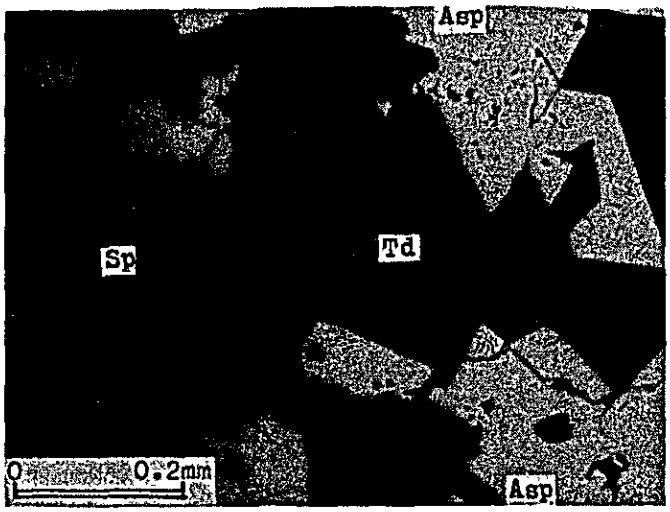
Rock type:

Copper, zinc, lead ore

Sample No. D-Sp-2

Rock type:

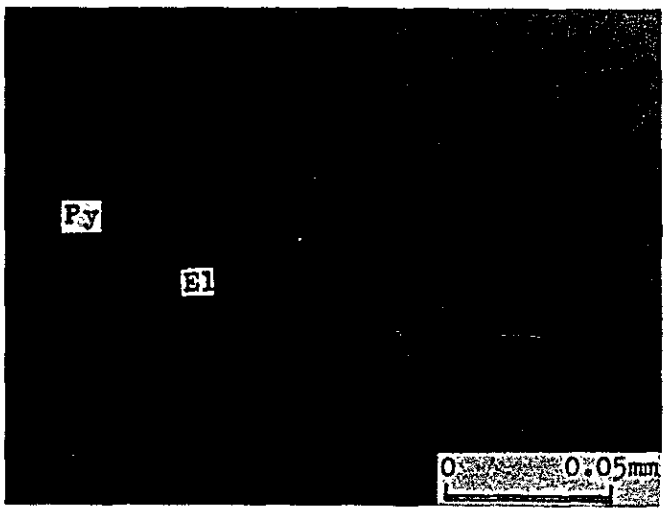
Copper, zinc, lead ore



Sample No. OD-B

Rock type:

Copper, zinc, lead ore



Sample No. OD-C

Rock type:

Gold ore

A. I-5-3 EPMA Analysis

Abbreviations

Py : Pyrite

El : Electrum

Bl : Boulangerite

Asp : Arsenopyrite

Sp : Sphalerite

Fr : Freibergite

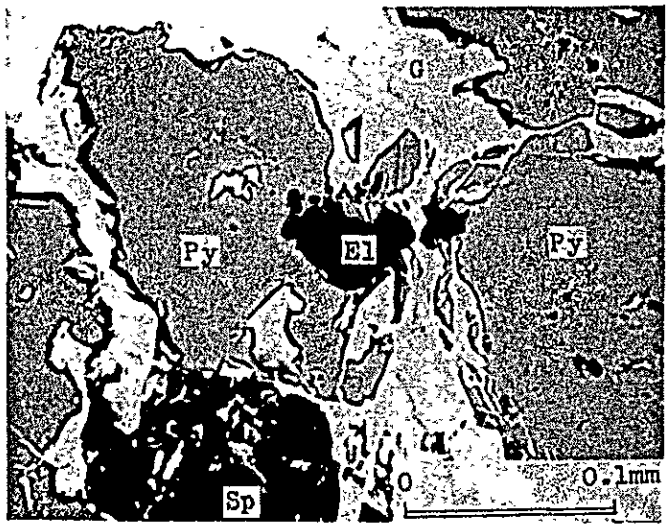
Cp : Chalcopyrite

Gn : Galena

Td : Tetrahedrite

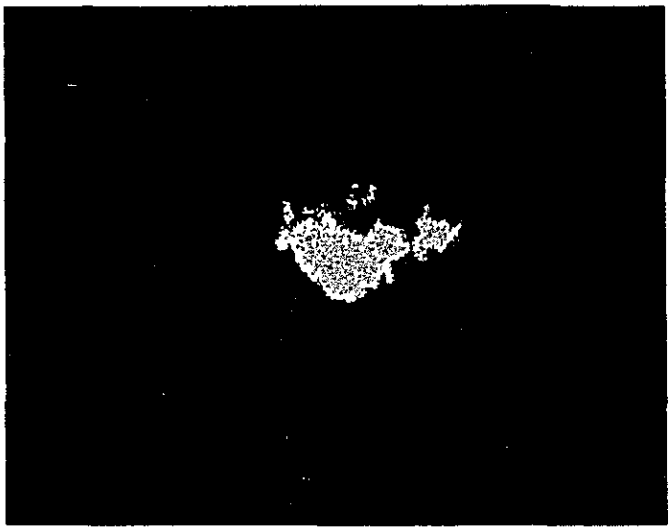
G : Gangue mineral

(1)

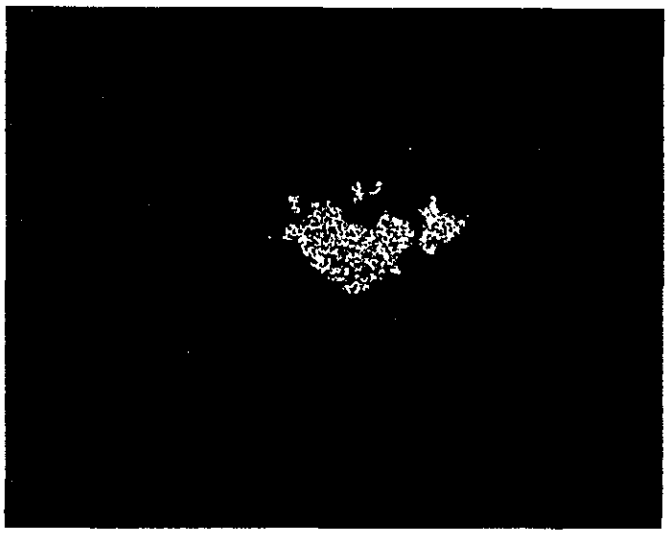


Absorbed electron image

Electrum occurs in/border of pyrite

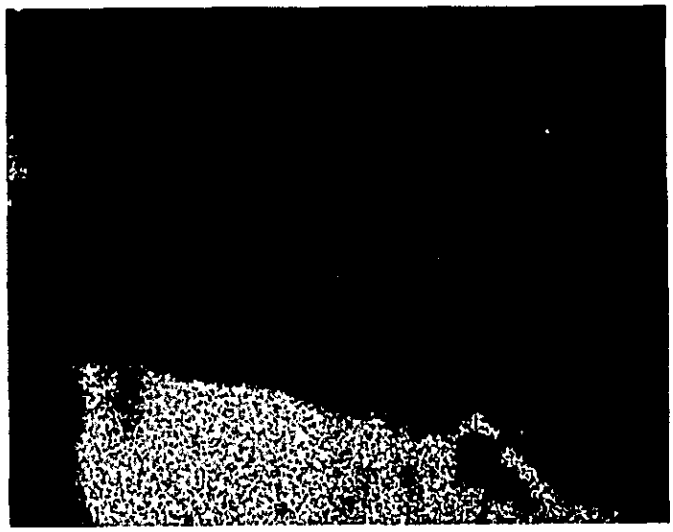


Au X-ray image

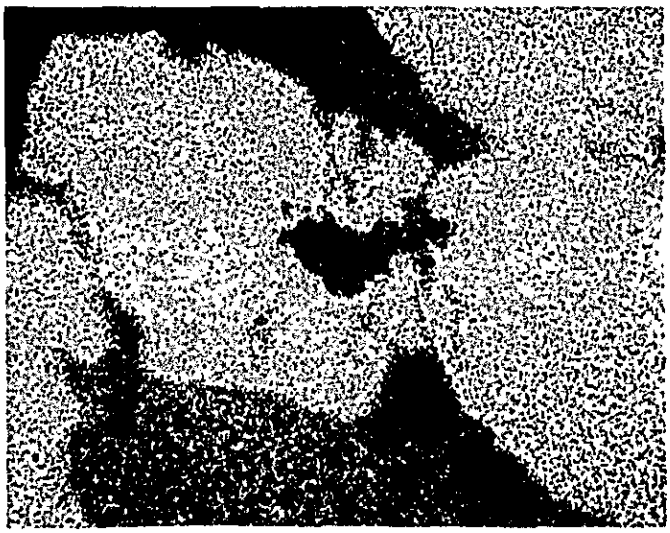


Ag X-ray image

Sample No. : ND-17A
Locality : Diamante
Accel. volt. : 25 kV
Absorb. elect. : 0.2 μA



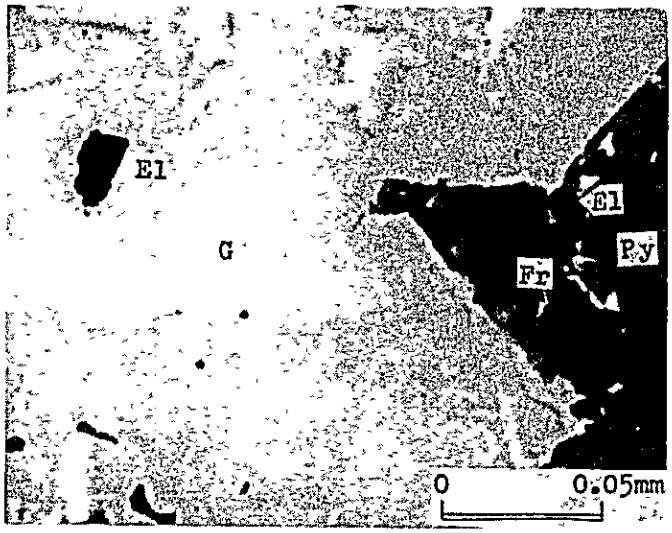
Zn X-ray image



Fe X-ray image

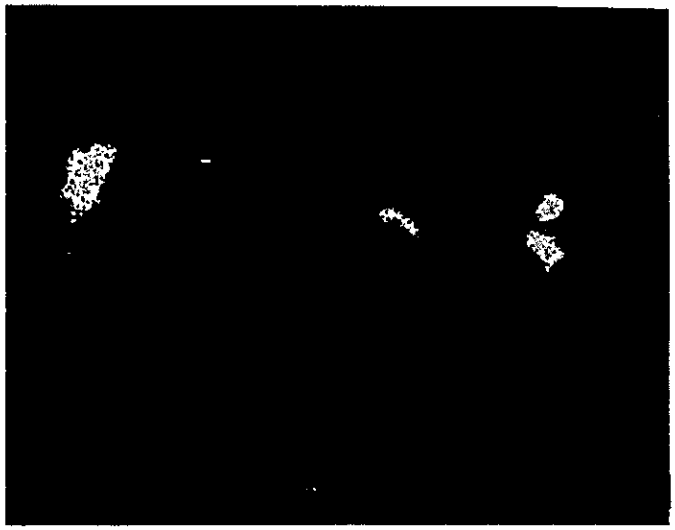
S X-ray image

(continuation of No.ND-17A)



Absorbed electron image

Freibergite (Ag bearing Tetrahedrite) and electrum occur in fringe of pyrite, and another electrum in gangue (quartz).



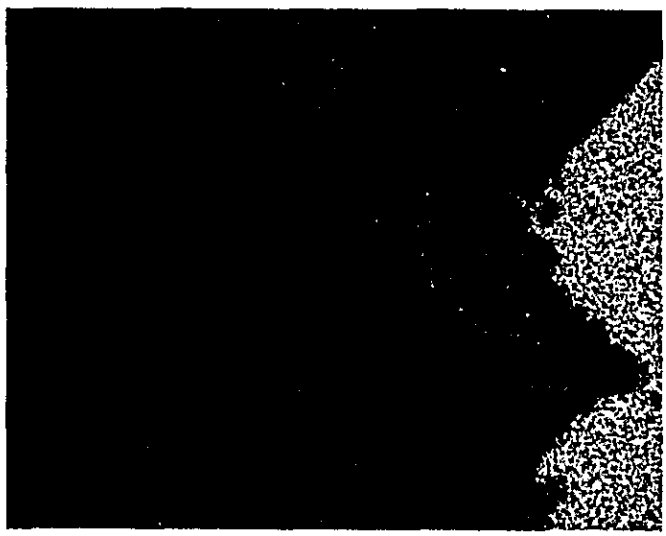
Au X-ray image

Ag X-ray image

Sample No.	: ND-17B
Locality	: Diamante
Accel. volt.	: 15 kV
Absorb. elect.	: 0.1 μA

Cu X-ray image

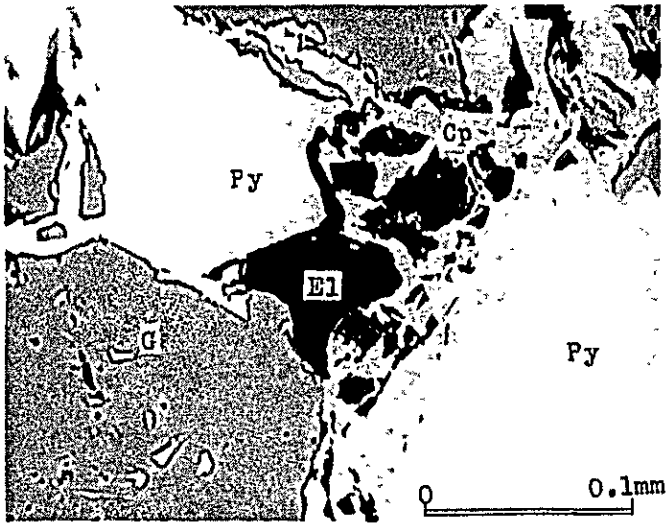
Sb X-ray image



Fe X-ray image

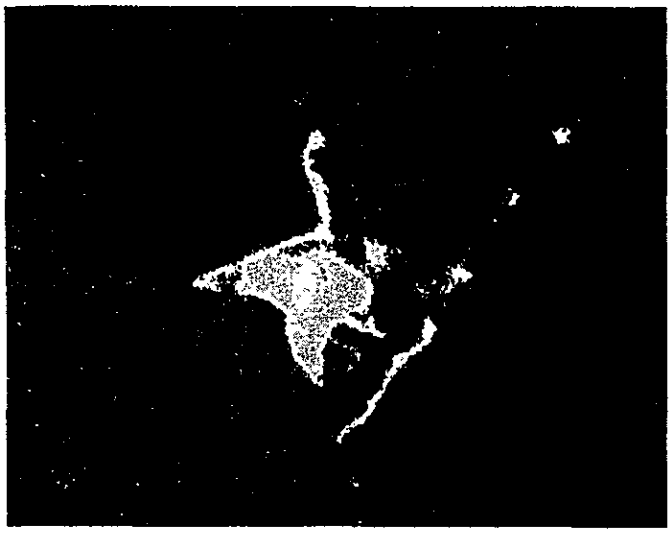
(continuation of No.17B)

(5)



Absorbed electron image

Electrum associated with chalcopyrite, between pyrite crystals



Au X-ray image

Ag X-ray image

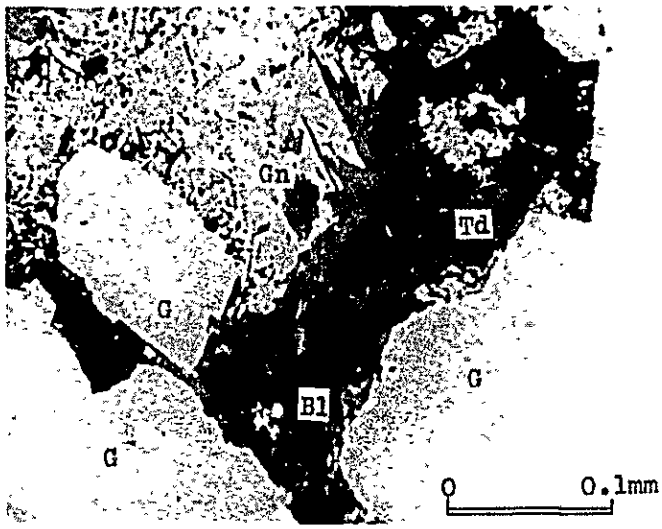
Sample No. : ND-42
Locality : Diamante
Accel. volt. : 25 kV
Absorb. elect. : 0.2 μA

Cu X-ray image

Fe X-ray image

S X-ray image

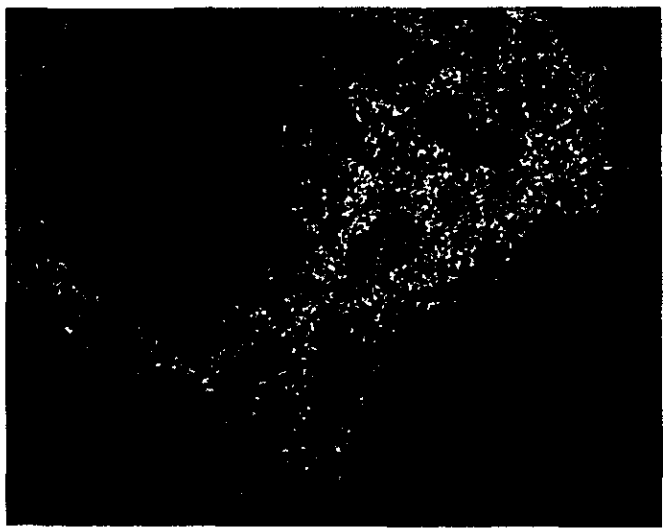
(continuation of No.ND-42)



Absorbed electron image

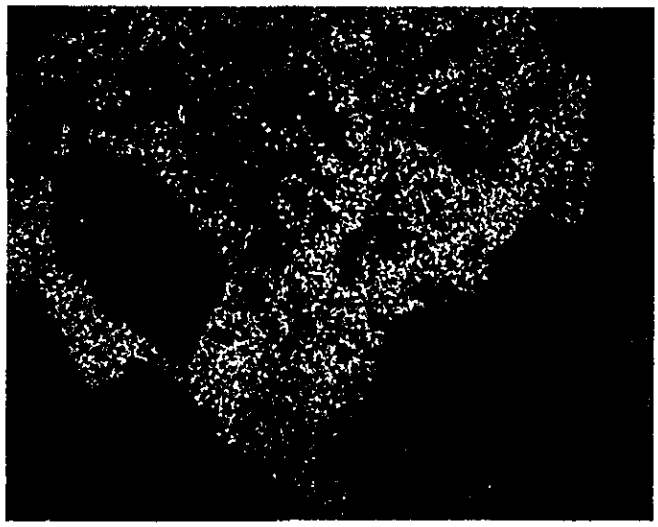
Tetrahedrite (Td:$3Cu_2S \cdot Sb_2S_3$) and Boulangerite (Bl:$5PbS \cdot 2Sb_2S_3$) and determinated.

Pb X-ray image



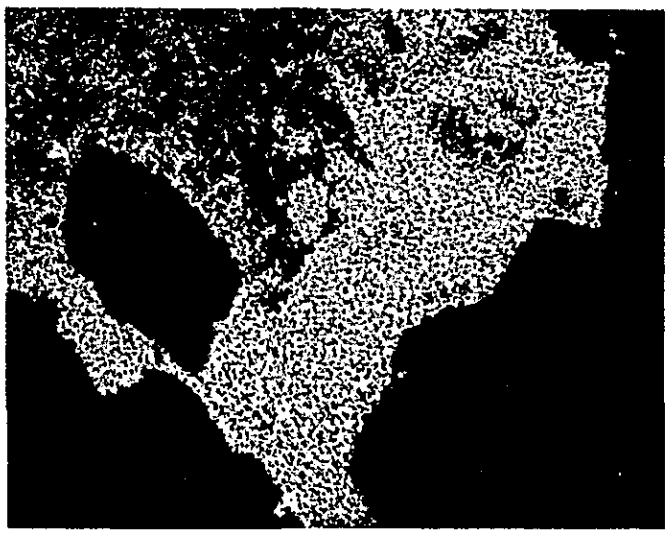
Cu X-ray image

Sample No. : ND-49A
Locality : Diamante
Accel. volt. : 15 kV
Absorb. elect. : 0.1 μA



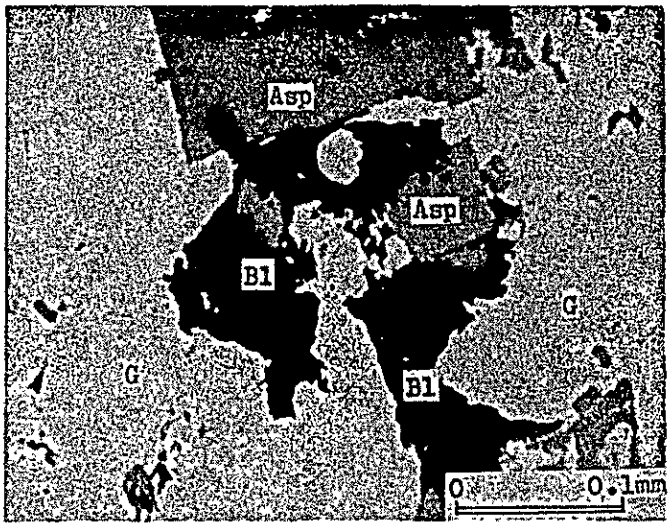
Sb X-ray image

Fe X-ray image



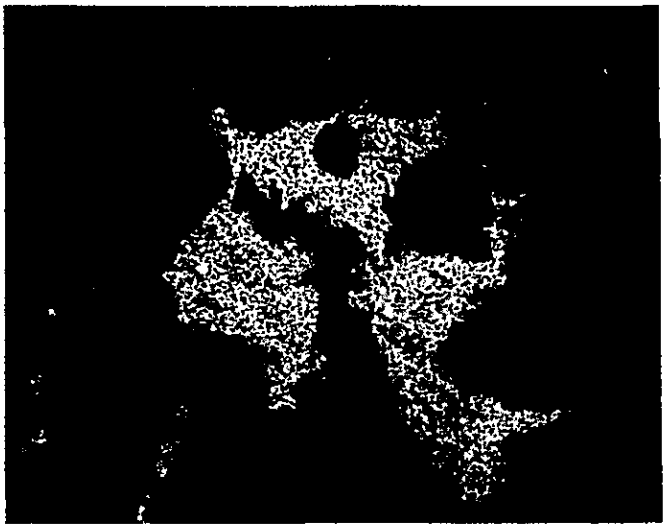
S X-ray image

(continuation of No.ND-49A)

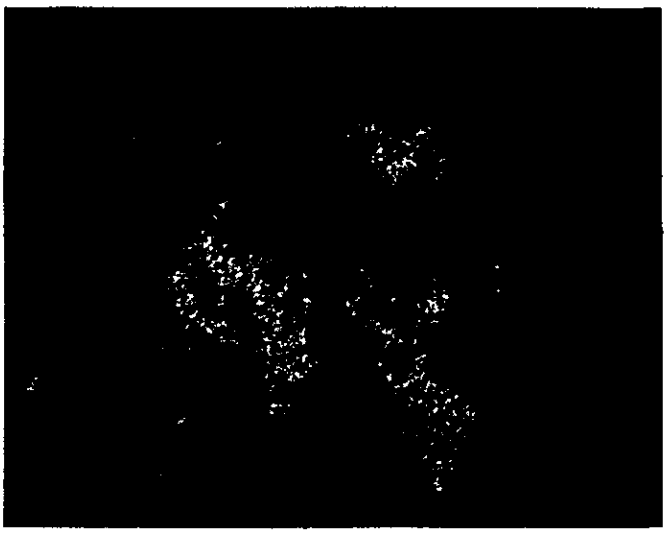


Absorbed electron image

Boulangerite ($5PbS.2Sb_2S_3$) occurs in space between quartz and arsenopyrite which are crystallized earlier.
(Ref: Photograph of polished section of No.ND-49)

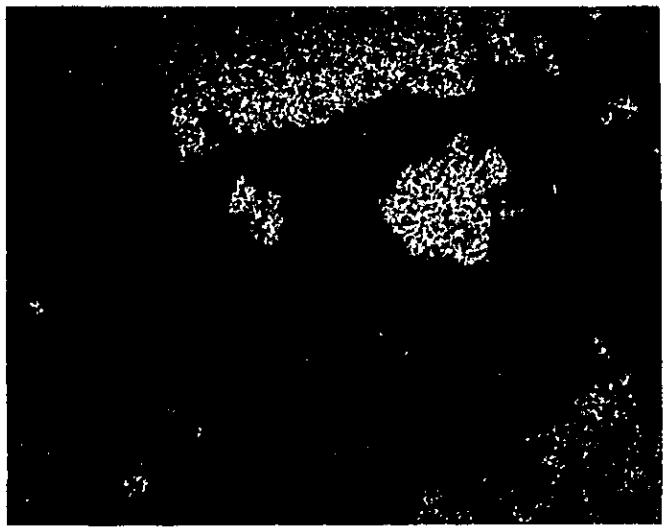


Pb X-ray image



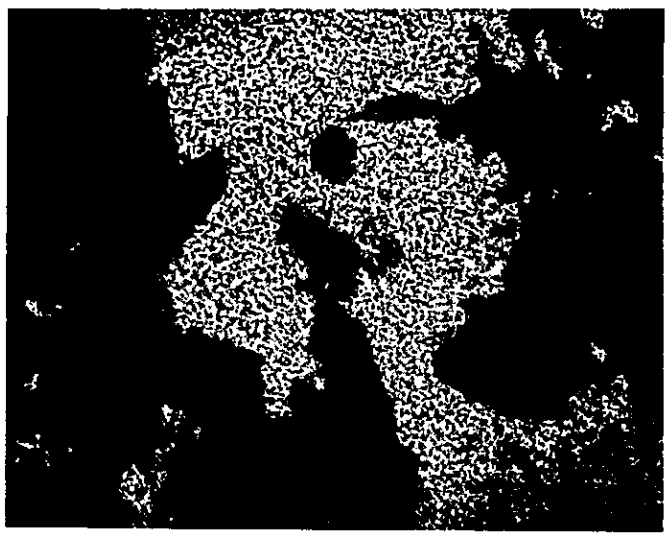
Sb X-ray image

Sample No. : ND-49B
Locality : S. Sebastean
Accel. volt. : 15 kV
Absorb. elect. : 0.1 μA



Fe X-ray image

As X-ray image



S X-ray image

(continuation of No.ND-49B)

APPENDICES
PART II
DRILLING DATA

LIST OF APPENDICES

A. Ⅱ - 1 List of the Used Equipments for Drilling

Item	Model	Quantity	Capacity, Type, and Specification
Drilling Machine	TOM-3B	1	Capacity NQ 590m BQ 750m Inner Diameter of Spindle 92mm Weight (except engine) 120,250,600,120R
Engine for Drill	F3L-912	1	Diesel Engine 1,800 rpm/41 PS ∿ 1,500 rpm/35 PS
Pump	NAS-2A	1	Piston ϕ 63mm Capacity 62 ∿ 45 ℓ/min Pressure 27 ∿ 37 Kg/cm^2
Engine for pump	NS-110C	1	Diesel Engine 1,800 rpm/9.5 PS
Generator	YSG-5SN	1	5KVA, 110V, 50 C/S
"	YSG-3	1	3KVA, 110V, 50 C/S
Engine for Generator	NS-90C	1	Diesel Engine 1,800 rpm/8.5 PS
"	NS-50C	1	Diesel Engine 1,800 rpm/4.5 PS
Pump	HOPE-F	1	Piston ϕ 13.8mm Capacity 60 ∿ 80 ℓ/min Pressure 40 ∿ 30 Kg/cm^2
Engine for pump	NS-90C	1	Diesel Engine 1,800 rpm/8.5 PS
Mud Mixer	MCE-100A	1	Volume 100ℓ, 800 ∿ 1,000 rpm/min
Derrick		1	Wooden
Rod Holer	RH-85	1	Hand Type
Drill Rods	NQ-WL	50	3.00 M/PC
	BQ-WL	70	3.00 M/PC
Casing Pipes	NW	30	3.00 M/PC
	"	3	1.00 M/PC
	BW	50	3.00 M/PC

A. Ⅱ-2 Supplies and Consumed Parts for Drilling

Description	Specification	Unit	Quantity						
			PD-1	PD-2	PD-3	PD-4	PD-5	PD-6	PD-7
Light oil		ℓ	990	990	1,530	1,260	1,250	1,690	2,340
Mobil oil		ℓ	10	10	10	20	10	25	180
Hydraulic oil		ℓ	-	-	10	-	-	-	80
Grease		kg	20	-	-	-	-	-	23
Bentonite	50 kg/bag	Bag	10	12	15	27	35	50	38
Libonite		kg	-	30	30	70	60	120	135
Tel-cellose		kg	10	10	15	20	15	25	20
Cement	50 kg/bag	Bag	10	-	-	6	5	15	11
Tel-stop		kg	10	-	-	60	60	110	10
Emale 20C		ℓ	-	-	-	50	20	20	20
Metal crown	101mm	Pc	1	5	3	4	2	2	2
Single core tube	99mm x 0.5m	Set	-	1	-	-	-	-	-
Double core tube	99mm x 1.5m	"	1	-	-	-	-	-	-
Wire line core barrel	x 0m	"							
" "	NQ x 3.00m	"	1	-	-	-	-	-	-
" "	BQ x 3.00m	"	1	-	-	-	-	-	-
Inner tube assembly	x 0m	"							
" "	NQ x 3.00m	"	-	-	1	-	-	-	-
" "	BQ x 3.00m	"	-	-	-	1	-	-	-
Outer tube	x 0m	Pc							
"	NQ x 3.00m	"	-	1	-	-	-	-	-
"	BQ x 3.00m	"	1	-	-	-	-	-	-
Inner tube	x 3.00m	"	-						
"	NQ x 3.00m	"	-	1	-	-	-	-	-
"	BQ x 3.00m	"	-	-	1	-	-	-	-
Casing metal shoe		"							
"	NW	"	1	1	1	1	1	1	1
"	BW	"	1	1	1	1	1	1	1
Rag		kg	15	10	10	10	10	10	15
Core box		Pc	15	13	16	14	22	20	31
Wire	10	kg	20	10	10	20	20	10	20
"	12	"	15	10	10	10	10	10	10
Nail		"	5	3	5	10	3	2	5
Wire rope	6mm x 200m	Roll	0.5	-	-	-	0.5	-	0
"	12mm x 90m	"	1	-	-	-	-	-	-
Manila rope	18mm x 100m	Pc	1	-	-	-	-	-	-
Vinyl rope	9mm x 300m	"	0.5	-	-	-	0.5	-	-
Pump packing		"	-	1	-	-	-	-	-
Valve steel ball	38.1ϕ	"	-	-	1	-	-	-	-

Supplies and Consumed Parts for Drilling-Continued

Description	Specification	Unit	Quantity						
			PD-1	PD-2	PD-3	PD-4	PD-5	PD-6	PD-7
Piston rod		Pc	-	-	1	-	-	-	-
Guide pipe		"							
"	NQ	"	-	-	1	-	-	-	-
"	BQ	"	-	1	-	-	-	-	-
Guide coupling		"							
"	NQ	"	-	-	1	-	-	-	-
"	BQ	"	-	1	-	-	-	-	-
Suction hose	38mm x 3.0m	"	1	-	-	-	-	-	-
Water swivel packing		"	-	1	-	1	-	-	-
Water swivel spindle		"	-	-	1	-	-	-	-
V-belt	TOM-3 F31-912	Set	1	-	-	-	1	-	-
"		"							
Core lifter		Pc							
"	NQ	"	2	1	3	4	2	1	2
"	BQ	"	2	2	2	3	2	2	2
Core lifter case		"							
"	NQ	"	1	1	1	2	1	1	1
"	BQ	"	2	1	1	1	2	1	2

A. Ⅱ-3 Preparation and Removal

Item \ Hole No.		PD-1		PD-2		PD-3		PD-4		PD-5		PD-6		PD-7	
Preparation and removal	In	8th.Dcec.'81		1st.Dcec.'81		18th.Nov.'81		10th.Nov.'81		28th.Oct.'81		16th.Oct.'81		21th.Spt.'81	
		10th.Dcec.'81		2nd.Dcec.'81		22th.Nov.'81		10th.Nov.'81		1st.Nov.'81		16th.Oct.'81		30th.Spt.'81	
	Out	15th.Dcec.'81		7th.Dcec.'81		30th.Nov.'81		17th.Nov.'81		9th.Nov.'81		27th.Oct.'81		15th.Oct.'81	
		16th.Dcec.'81		7th.Dcec.'81		30th.Nov.'81		17th.Nov.'81		9th.Nov.'81		27th.Oct.'81		15th.Oct.'81	
		Days	Man-shifts	Days	Man-shifts	Days	Man-shifts	Days	Man-shifts	Days	Man-shifts	Days	Man-shifts	Days	Man shifts
Preparation	Access road			0.5	9			0.3	66			0.3	6		
	Haulage	1	18			3	63			3	70	0.3	7		
	Installation	1	18	0.5	6	1.7	32	0.3	7	1.7	31			2	20
	Water pipe	0.3	9	0.3	3	0.3	6			0.3	6			1	10
	Test run, etc.													7	40
	Total	2.3	45	1.3	18	5	101	0.6	13	5	107	0.6	13	10	70
Removal	Dismounting	1.0	15	0.2	3	0.2	3	0.4	3	0.5	6	0.5	4	0.3	4
	Pipe removal	0.4	6	0.2	3	0.2	3	0.4	3	0.5	4	0.5	6	0.3	6
	Haulage														
	Road reinstatement														
	Others														
	Total	1.4	21	0.4	6	0.4	6	0.8	6	1	10	1	10	0.6	10
Grand Total		2.7	66	1.7	24	5.4	107	1.4	19	6	117	1.6	23	10.6	80

A. Ⅱ-4 Operational Results of Drill Hole, PD-Ⅰ

Working Period

	Period	Number of Days	Actual Working Days	Day Off	Total Number of Workers
Preparation	8th.Dcec. 81~10th.Dcec.'81	2.3	2.3	-	45
Drilling	10th.Dcec.'81~15th.Dcec.'81	5.3	5.3	-	97
Removing	15th.Dcec.'81~16th.Dcec.'81	1.4	1.4	-	21
Total	8th.Dcec.'81~16th.Dcec.'81	9.0	9.0	-	163

Drilling Length

Planned Length	m 80.00	Over-burden	m 4.30	Core Recovery for each 100 m section
Increase or Decrease in Length	m	Core Length	m 79.20	Depth of Hole / Section / Total
Length Drilled	m 83.50	Core Recovery	100%	0~83.50m / 100% / 100%

Working Time

Drilling	65°00'	47.8%	37.8%	
Hoisting & Lowering Rod	10°00'	7.4%	5.8%	
Hoisting & Lowering I.T.	35°00'	25.7%	20.3%	
Miscellaneous	18°00'	13.2%	10.5%	
Repairing	-	- %	- %	
Others	8°00'	5.9%	4.7%	
Sub Total	136°00'	100.0%	79.1%	
Removing: Preparation	13°00'	-	7.5%	
Removing: Moving	23°00'	-	13.4%	
Grand Total	172°00'	-	100.0%	

Efficiency of Drilling

83.50 m/Working Period	9.27 m/day
83.50 m/Working Days	9.27 m/day
83.50 m/Drilling Period	15.75 m/day
83.50 m/Net Drilling Days	15.75 m/day
Total workers/ 83.50 m	1.95 Man/m
Total Drilling Workers/ 83.50 m	1.16 Man/m

Casing Pipe Inserted

Pipe Size & Meterage	Inserted Length (%) / Drilling Length	Recovery of Casing Pipe
NW 7.40 m	8.8%	100%
BW 55.70 m	66.7%	100%

Hoisting & Lowering Rod 11 Times	Hoisting & Lowering I.T. 81 Times

Remarks

I.T.: Inner Tube

A. II-5 Operational Results of Drill Hole, PD-2

Working Period

	Period	Number of Days	Actual Working Days	Day Off	Total Number of Workers
Preparation	1st.Dcec.'81∿2nd.Dcec.'81	1.3	1.3	-	18
Drilling	2nd.Dcec.'81∿7th.Dcec.'81	5.3	5.3	-	95
Removing	7th.Dcec.'81∿7th.Dcec.'81	0.4	0.4	-	6
Total	1st.Dcec.'81∿7th.Dcec.'81	7.0	7.0	-	119

Drilling Length

Planned Length	80.00 m	Over-burden	19.00 m
Increase or Decrease in Length	m	Core Length	48.00 m
Length Drilled	81.00 m	Core Recovery	77.4%

Core Recovery for each 100 m section

Depth of Hole	Section	Total
0∿81.00m	77.4%	77.4%

Working Time

Drilling	68°00'	52.3%	44.2%
Hoisting & Lowering Rod	11°00'	8.5%	7.1%
Hoisting & Lowering I.T.	43°00'	33.0%	27.9%
Miscellaneous	8°00'	6.2%	5.2%
Repairing	-	- %	- %
Others	-	- %	- %
Sub Total	130°00'	100.0%	84.4%
Removing: Preparation	10°00'	-	6.5%
Removing: Moving	14°00'	-	9.1%
Grand Total	154°00'	-	100.0%

Efficiency of Drilling	
81.00 m/Working Period	11.57 m/day
81.00 m/Working Days	11.57 m/day
81.00 m/Drilling Period	15.28 m/day
81.00 m/Net Drilling Days	15.28 m/day
Total workers/ 81.00 m	1.46 Man/m
Total Drilling Workers/ 81.00 m	1.17 Man/m

Casing Pipe Inserted

Pipe Size & Meterage	Inserted Length (%) Drilling Length	Recovery of Casing Pipe
NW 25.20 m	31.1%	100%
BW 53.80 m	66.4%	100%

Hoisting & Lowering Rod 14 Times	Hoisting & Lowering I.T. 104 Times

Remarks

I.T.: Inner Tube

A. Ⅱ-6 Operational Results of Drill Hole, PD-3

Working Period

	Period	Number of Days	Actual Working Days	Day Off	Total Number of Workers
Preparation	18th.Nov.'81∿22th.Nov.'81	5.0	5.0	-	101
Drilling	23th.Nov.'81∿30th.Nov.'81	7.6	7.6	-	130
Removing	30th.Nov.'81∿30th.Nov.'81	0.4	0.4	-	6
Total	18th.Nov.'81∿30th.Nov.'81	13.0	13.0	-	237

Drilling Length

Planned Length	m 90.00	Over-burden	m 28.00
Increase or Decrease in Length	m	Core Length	m 51.50
Length Drilled	m 90.60	Core Recovery	82.2%

Core Recovery for each 100 m section

Depth of Hole	Section	Total
0∿90.60 m	82.2%	82.2%

Working Time

Drilling	108°00'	58.1%	44.6%
Hoisting & Lowering Rod	13°00'	7.0%	5.4%
Hoisting & Lowering I.T.	56°00'	30.1%	23.1%
Miscellaneous	9°00'	4.8%	3.7%
Repairing	-	- %	- %
Others	-	- %	- %
Sub Total	186°00'	100.0%	76.8%
Removing: Preparation	20°00'	-	8.3%
Removing: Moving	36°00'	-	14.9%
Grand Total	242°00'	-	100.0%

Efficiency of Drilling

90.60 m/Working Period	6.96 m/day
90.60 m/Working Days	6.96 m/day
90.60 m/Drilling Period	11.92 m/day
90.60 m/Net Drilling Days	11.92 m/day
Total workers/ 90.60 m	2.61 Man/m
Total Drilling Workers/ 90.60 m	1.43 Man/m

Casing Pipe Inserted

Pipe Size & Meterage	Inserted Length (%) / Drilling Length	Recovery of Casing Pipe
NW 24.50 m	27.0%	100%
BW 64.60 m	71.3%	100%

Hoisting & Lowering Rod	Hoisting & Lowering I.T.
18 Times	134 Times

Remarks

I.T.: Inner Tube

A. Ⅱ-7 Operational Results of Drill Hole, PD-4

		Period	Number of Days	Actual Working Days	Day Off	Total Number of Workers
Working Period	Preparation	10th.Nov.'81~10th.Nov.'81	0.6	0.6	-	13
	Drilling	10th.Nov.'81~17th.Nov.'81	6.6	6.6	-	117
	Removing	17th.Nov.'81~17th.Nov.'81	0.8	0.8	-	6
	Total	11th.Nov.'81~17th.Nov.'81	8.0	8.0	-	136

Drilling Length	Planned Length	100. m	Over-burden	4.10 m	Core Recovery for each 100 m section	
	Increase or Decrease in Length	m	Core Length	67.80 m	Depth of Hole	Section / Total
	Length Drilled	100.10 m	Core Recovery	70.6%	0~100.10m	70.6% / 70.6%

Working Time	Drilling	93°00'	57.1%	50.5%		
	Hoisting & Lowering Rod	9°00'	5.5%	4.9%		
	Hoisting & Lowering I.T.	53°00'	32.5%	28.8%		
	Miscellaneous	8°00'	4.9%	4.3%		
	Repairing	-	- %	- %		
	Others	-	- %	- %		
	Sub Total	163°00'	100.0%	88.6%		
	Removing: Preparation	10°00'	-	5.5%		
	Removing: Moving	11°00'	-	6.0%		
	Grand Total	184°00'	-	100.0%		

Efficiency of Drilling	
100.10 m/Working Period	12.51 m/day
100.10 m/Working Days	12.51 m/day
100.10 m/Drilling Period	15.16 m/day
100.10 m/Net Drilling Days	15.16 m/day
Total workers/ 100.10 m	1.36 Man/m
Total Drilling Workers/ 100.10 m	1.17 Man/m

Casing Pipe Inserted	Pipe Size & Meterage	Inserted Length (%) Drilling Length	Recovery of Casing Pipe
	NW 15.50 m	15.5%	100%
	BW 62.00 m	61.9%	100%

Hoisting & Lowering Rod	Hoisting & Lowering I.T.
16 Times	146 Times

Remarks

I.T.: Inner Tube

A. Ⅱ-8 Operational Results of Drill Hole, PD-5

Working Period

	Period	Number of Days	Actual Working Days	Day Off	Total Number of Workers
Preparation	28th.Oct.'81∿1st.Nov.'81		5	-	107
Drilling	2nd.Nov.'81∿8th.Nov.'81	7	7	-	101
Removing	9th.Nov.'81∿9th.Nov.'81	1	1	-	10
Total	28th.Oct.'81∿9th.Nov.'81	13	13	-	218

Drilling Length

Planned Length	120.00 m	Over-burden	11.80 m
Increase or Decrease in Length	m	Core Length	100.60 m
Length Drilled	120.70 m	Core Recovery	92.4%

Working Time

Drilling	126°00'	71.6%	55.3%
Hoisting & Lowering Rod	6°00'	3.4%	2.6%
Hoisting & Lowering I.T.	40°00'	22.7%	17.5%
Miscellaneous	4°00'	2.3%	1.8%
Repairing	-	- %	- %
Others	-	- %	- %
Sub Total	176°00'	100.0%	77.2%
Removing: Preparation	17°00'	-	7.5%
Removing: Moving	35°00'	-	15.3%
Grand Total	228°00'	-	100.0%

Core Recovery for each 100 m section

Depth of Hole	Section	Total
0 ∿ 100 m	95.0%	95.0%
100∿120.70 m	80.3%	92.3%

Efficiency of Drilling

120.70 m/Working Period	9.28 m/day
120.70 m/Working Days	9.28 m/day
120.70 m/Drilling Period	17.24 m/day
120.70 m/Net Drilling Days	17.24 m/day
Total workers/ 120.70 m	1.81 Man/m
Total Drilling Workers/ 120.70 m	0.84 Man/m

Hoisting & Lowering Rod 10 Times	Hoisting & Lowering I.T. 148 Times

Casing Pipe Inserted

Pipe Size & Meterage	Inserted Length (%) Drilling Length	Recovery of Casing Pipe
NW 12.00 m	9.9%	100%
BW 75.00 m	62.1%	100%

Remarks

I.T.: Inner Tube

A. Ⅱ-9 Operational Results of Drill Hole, PD-6

Working Period

	Period	Number of Days	Actual Working Days	Day Off	Total Number of Workers
Preparation	16th.Oct'81∿16th.Oct.'81	0.6	0.6	-	13
Drilling	16th.Oct.'81∿26th.Oct.'81	10.4	10.4	-	135
Removing	27th.Oct.'81∿27th.Oct.'81	1.0	1.0	-	10
Total	16th.Oct.'81∿27th.Oct.'81	12.0	12.0	-	158

Drilling Length

Planned Length	120.00 m	Over-burden	6.70 m
Increase or Decrease in Length	m	Core Length	96.80 m
Length Drilled	120.60 m	Core Recovery	84.9%

Working Time

Drilling	142°00'	59.2%	53.8%
Hoisting & Lowering Rod	10°00'	4.2%	3.8%
Hoisting & Lowering I.T.	59°00'	24.6%	22.3%
Miscellaneous	14°00'	5.8%	5.3%
Repairing	-	- %	- %
Others	15°00'	6.2%	5.7%
Sub Total	240°00'	100.0%	90.9%
Removing: Preparation	8°00'	-	3.0%
Removing: Moving	16°00'	-	6.1%
Grand Total	264°00'	-	100.0%

Core Recovery for each 100 m section

Depth of Hole	Section	Total
0 ∿ 100 m	82.3%	82.3%
100∿120.60 m	97.0%	84.9%

Efficiency of Drilling

120.60 m/Working Period	10.05 m/day
120.60 m/Working Days	10.05 m/day
120.60 m/Drilling Period	11.59 m/day
120.60 m/Net Drilling Days	11.59 m/day
Total workers/ 120.60 m	1.31 Man/m
Total Drilling Workers/ 120.60 m	1.11 Man/m

Casing Pipe Inserted

Pipe Size & Meterage	Inserted Length (%) Drilling Length	Recovery of Casing Pipe
NW 16.00 m	13.2%	100%
BW 72.10 m	59.7%	100%

Hoisting & Lowering Rod 16 Times	Hoisting & Lowering I.T. 176 Times

Remarks

I.T.: Inner Tube

A. Ⅱ - 10 Operational Results of Drill Hole, PD-7

Working Period

	Period	Number of Days	Actual Working Days	Day Off	Total Number of Workers
Preparation	21th.Spt.'81∿30th.Spt.'81	10	5	5	70
Drilling	1st.Oct.'81∿15th.Oct.'81	14.4	14.4	-	211
Removing	15th.Oct.'81∿15th.Oct.'81	0.6	0.6	-	10
Total	21th.Spt.'81∿15th.Oct.'81	25.0	20.0	5	291

Drilling Length

Planned Length	160.00 m	Over-burden	4.0 m
Increase or Decrease in Length	m	Core Length	152.30 m
Length Drilled	160.70 m	Core Recovery	97.1%

Working Time

Drilling	98°00'	30.2%	26.6%
Hoisting & Lowering Rod	13°00'	4.0%	3.5%
Hoisting & Lowering I.T.	169°00'	52.2%	45.9%
Misceelaneous	28°00'	8.7%	7.6%
Repairing	-	- %	- %
Others	16°00'	4.9%	4.4%
Sub Total	324°00'	100.0%	88.0%
Removing: Preparation	40°00'	-	10.9%
Removing: Moving	4°00'	-	1.1%
Grand Total	368°00'	-	100.0%

Core Recovery for each 100 m section

Depth of Hole	Section	Total
0 ∿ 100 m	96.8%	96.8%
100∿160.70 m	97.6%	97.1%

Efficiency of Drilling

160.70 m/Working Period	6.43 m/day
160.70 m/Working Days	8.04 m/day
160.70 m/Drilling Period	11.16 m/day
160.70 m/Net Drilling Days	11.16 m/day
Total workers/ 160.70 m	1.81 Man/m
Total Drilling Workers/ 160.70 m	1.31 Man/m

Casing Pipe Inserted

Pipe Size & Meterage	Inserted Length (%) Drilling Length	Recovery of Casing Pipe
NW 13.10 m	8.1%	100%
BW 113.10 m	70.3%	100%

Hoisting & Lowering Rod 16 Times	Hoisting & Lowering I.T. 294 Times

Remarks

I.T.: Inner Tube

A. Ⅱ - 1 1 Summerized Operational Data of Each Drill Hole

Drill hole No.	Type of machine	Drilling period	Drilling length	Length	Recovery	Drilling	Casing etc.	Total	* m/shift	** m/shift	Remarks
PD-1	TOM-3	10th.Dcec.'81 ∿ 15th.Dcec.'81	83.50	79.20	100.0	15	1	16	5.57	5.52	
PD-2	TOM-3	2th.Dcec.'81 ∿ 7th.Dcec.'81	81.00	48.00	77.4	15	1	16	5.40	5.06	
PD-3	TOM-3	23th.Nov.'81 ∿30th.Nov.'81	90.60	51.50	82.2	22	1	23	4.12	3.94	
PD-4	TOM-3	10th.Nov.'81 ∿17th.Nov.'81	100.10	67.80	70.6	19	1	20	5.27	5.01	
PD-5	TOM-3	2th.Nov.'81 ∿ 8th.Nov.'81	120.70	100.60	92.3	20	1	21	6.04	5.75	
PD-6	TOM-3	16th.Oct.'81 ∿ 26th.Oct.'81	120.60	96.80	84.9	24	4	28	5.03	4.31	
PD-7	TOM-3	1st.Oct.'81 ∿ 15th.Oct.'81	160.70	152.30	97.1	35	4	39	4.59	4.12	
	Total		757.20	596.20	87.7	150	13	163	5.05	4.65	

* Drilled per one shift covering net drilling operations.
** Drilled per one shift covering total works conducted.

A. Ⅱ - 12 Working Time of Each Drill Hole

Drill hole No.	Dilling	Hoisting & lowering of rod & I.T.		Miscellaneous			Repairs	Others	Moving operation	Total
		Rod	Inner tube	Casing insertion	Hole reaming	Others				
PD-1	65°00'	10°00'	35°00'	10°00'	-	8°00'	-	8°00'	36°00'	172°00'
PD-2	68°00'	11°00'	43°00'	8°00'	-	-	-	-	24°00'	154°00'
PD-3	108°00'	13°00'	56°00'	8°00'	-	1°00'	-	-	56°00'	242°00'
PD-4	93°00'	9°00'	53°00'	8°00'	-	-	-	-	21°00'	184°00'
PD-5	126°00'	6°00'	40°00'	4°00'	-	-	-	-	52°00'	228°00'
PD-6	142°00'	10°00'	59°00'	8°00'	-	6°00'	-	15°00'	24°00'	264°00'
PD-7	98°00'	13°00'	169°00'	16°00'	-	12°00'	-	16°00'	44°00'	368°00'
Total	700°00'	72°00'	455°00'	62°00'	-	27°00'		39°00'	257°00'	1,612°00'
				89°00'						

A. II - 13 Drilling Meterage of Diamond Bits

Item	Size	Type	Bit No.	Drilling meterage by drill hole. Unit meter							Total
				PD-1	PD-2	PD-3	PD-4	PD-5	PD-6	PD-7	
Bit	NX	NQ-WL	M-3773	15.10							15.10
			M-3774	10.50							10.50
			M-3775	9.20							9.20
			M-3776	13.50							13.50
			M-3777		5.10						5.10
			M-3778		8.70						8.70
			M-3779		4.00						4.00
			M-3780		10.80						10.80
			M-3781			13.00					13.00
			M-3782			15.10					15.10
			M-3783			12.00					12.00
			M-3784				4.20				4.20
			M-3785				6.80				6.80
			M-3786				10.00				10.00
			M-3787				11.00				11.00
			M-3788				14.50				14.50
			M-3789					13.60			13.60
			M-3790					16.20			16.20
			M-3791					16.80			16.80
			M-3792					16.40			16.40
			M-3793						9.10		9.10
			M-3794						17.10		17.10
			M-3795						15.00		15.00
			M-3796						14.90		14.90
			M-3797							5.60	5.60
			M-3798							8.40	8.40
			M-3799							18.10	18.10
			M-3800							11.20	11.20
			F-1016							14.80	14.80
			F-1020							16.00	16.00
			F-6534							15.00	15.00
			F-6536							11.90	11.90
			Total	48.30	28.60	40.10	46.50	63.00	56.10	101.00	383.60

Item	Size	Type	Bit No.	Drilling meterage by drill hole. Unit meter							
				PD-1	PD-2	PD-3	PD-4	PD-5	PD-6	PD-7	
	BX	BW-WL	M-3801	8.10							8.10
			M-3802	10.00							10.00
			M-3803	9.70							9.70
			M-3804		6.20						6.20
			M-3805		9.40						9.40
			M-3806		11.60						11.60
			M-3807			5.30					5.30
			M-3808			8.10					8.10
			M-3809			12.60					12.60
			M-3810				4.80				4.80
			M-3811				6.10				6.10
			M-3812				9.60				9.60
			M-3813				4.60				4.60
			M-3814]				5.50				5.50
			M-3815				7.50				7.50
			M-3816					13.70			13.70
			M-3817					18.10			18.10
			M-3818					13.90			13.90
			M-3819						10.50		10.50
			M-3820						13.00		13.00
			M-3821						4.00		4.00
			M-3822						2.50		2.50
			M-3823						4.30		4.30
			M-3824						6.20		6.20
			M-3825						8.00		8.00
			F-6648							16.00	16.00
			C-2808							14.00	14.00
			C-2809							17.60	17.60
			Total	27.80	27.20	26.00	38.10	45.70	48.50	47.60	260.90

A. Ⅱ - 14 Specifications of Diamond Bits

Size	Type	Carats per bit	Matrix	Stones per carat	Water way	Number	Remark
NX	NQ-WL	30	ZZ	1/30	4	M-3773	Reset
		30	Z	1/30	4	M-3774	"
		30	Z	1/30	4	M-3775	"
		30	Y	1/30	4	M-3776	"
		30	Z	1/30	4	M-3777	"
		30	Z	1/30	4	M-3778	"
		30	ZZ	1/30	4	M-3779	"
		30	Z	1/30	4	M-3780	"
		30	Z	1/30	4	M-3781	"
		30	Z	1/30	4	M-3782	"
		30	Z	1/30	4	M-3783	"
		30	ZZ	1/30	4	M-3784	"
		30	ZZ	1/30	4	M-3785	"
		30	Z	1/30	4	M-3786	"
		30	Z	1/30	4	M-3787	"
		30	Z	1/30	4	M-3788	"
		30	ZZ	1/30	4	M-3789	
		30	Z	1/30	4	M-3790	"
		30	Z	1/30	4	M-3791	"
		30	Z	1/30	4	M-3792	"
		30	Z	1/30	4	M-3793	"
		30	Z	1/30	4	M-3794	"
		30	ZZ	1/30	4	M-3795	"
		30	Z	1/30	4	M-3796	"
		30	ZZ	1/30	4	M-3797	"
		30	ZZ	1/30	4	M-3798	"
		30	ZZ	1/30	4	M-3799	"
		30	ZZ	1/30	4	M-3800	"
		30	Z	1/30	4	F-1016	"
		30	Z'	1/30	4	F-1020	"
		30	Y	1/30	4	F-6534	"
		30	Y	1/30	4	F-6536	"

Specifications of diamond bits

Size	Type	Carats per bit	Matrix	Stones per carat	Water way	Number	Remark
BX	BQ-WL	20	Z	1/30	4	M-3801	Reset
		20	Z	1/30	4	M-3802	"
		20	Z	1/30	4	M-3803	"
		20	ZZ	1/30	4	M-3804	"
		20	Z	1/30	4	M-3805	"
		20	Z	1/30	4	M-3806	"
		20	ZZ	1/30	4	M-3807	"
		20	ZZ	1/30	4	M-3808	"
		20	Z	1/30	4	M-3809	"
		20	Z	1/30	4	M-3810	"
		20	Z	1/30	4	M-3811	"
		20	Z	1/30	4	M-3812	"
		20	Z	1/30	4	M-3813	"
		20	ZZ	1/30	4	M-3814	"
		20	ZZ	1/30	4	M-3815	"
		20	Z	1/30	4	M-3816	"
		20	Z	1/30	4	M-3817	"
		20	Z	1/30	4	M-3818	"
		20	ZZ	1/30	4	M-3819	"
		20	Z	1/30	4	M-3820	"
		20	ZZ	1/30	4	M-3821	"
		20	ZZ	1/30	4	M-3822	"
		20	ZZ	1/30	4	M-3823	"
		20	Z	1/30	4	M-3824	"
		20	Z	1/30	4	M-3825	"
		20	Y	1/30	4	F-6648	"
		20	Z	1/30	4	C-2808	"
		20	Z	1/30	4	C-2809	"

A. II - 15 Assay Results of the Drilled Core

Sample No.	Length (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)	Sb (%)	As (%)
D 1006	6.4∿ 7.0	tr	tr	0.02	0.00	0.00	0.01	0.03
D 1016	15.8∿17.1	tr	tr	0.02	0.00	0.00	0.00	0.00
D 1019	18.8∿19.2	tr	tr	0.01	0.00	0.00	0.00	0.00
D 1033	33.3∿34.1	tr	tr	0.01	0.01	0.04	0.00	0.01
D 1045	45.3∿46.3	tr	tr	0.00	0.00	0.01	0.00	0.02
D 2051	51.0∿51.6	tr	tr	0.01	0.00	0.00	0.00	0.00
D 2065	65.6∿66.4	tr	tr	0.02	0.01	0.01	0.01	0.03
D 2066	66.4∿67.0	tr	tr	0.01	0.01	0.01	0.01	0.03
D 2067	67.0∿67.8	tr	tr	0.01	0.00	0.01	0.00	0.01
D 2072	72.2∿72.7	tr	tr	0.01	0.00	0.01	0.00	0.01
D 2073	73.1∿73.8	tr	tr	0.01	0.00	0.01	0.00	0.01
D 2074	73.8∿75.7	tr	tr	0.01	0.00	0.00	0.00	0.00
D 2075	75.7∿76.3	tr	tr	0.01	0.00	0.01	0.00	0.01
D 3048	48.2∿49.5	tr	3	0.01	0.00	0.11	0.01	0.15
D 3051	51.5∿54.0	0.2	4	0.05	0.01	0.09	0.01	0.13
D 3057	57.3∿58.5	tr	tr	0.01	0.00	0.04	0.01	0.10
D 3066	65.7∿66.9	tr	tr	0.01	0.01	0.03	0.01	0.09
D 3069	69.0∿70.4	tr	tr	0.01	0.01	0.01	0.01	0.09
D 3073	72.7∿74.1	tr	tr	0.00	0.02	0.08	0.01	0.24
D 3080	80.2∿81.0	9.6	5	0.04	0.00	0.00	0.01	0.01
D 3087	86.7∿87.4	0.2	4	0.02	0.01	0.10	0.01	0.05
D 4060	60.5∿64.8	tr	tr	0.01	0.01	0.04	0.01	0.08
D 4065	64.8∿69.0	tr	tr	0.01	0.01	0.05	0.01	0.09
D 4069	69.0∿71.8	tr	tr	0.01	0.01	0.07	0.01	0.16
D 5087	86.9∿87.4	9.0	105	0.44	0.06	13.14	0.03	17.54
D 5095	94.9∿95.8	0.4	8	0.02	0.02	0.67	0.01	1.67
D 5096	99.5∿100.0	tr	tr	0.00	0.01	0.01	0.00	0.03
D 5105	104.9∿106.6	1.6	14	0.03	0.05	0.63	0.00	2.41
D 5108	108.6∿110.0	0.5	23	0.09	0.10	1.04	0.00	1.55
D 5110	110.0∿113.7	0.7	6	0.04	0.09	0.58	0.00	1.28
D 5114	113.7∿115.0	1.5	8	0.02	0.12	0.30	0.00	0.82
D 5118	117.8∿118.8	tr	tr	0.00	0.01	0.01	0.01	0.05
D 6064	63.6∿65.0	0.5	12	0.03	0.00	0.09	0.00	0.06
D 6065	65.0∿66.0	2.0	25	0.12	0.01	1.94	0.00	4.36

Sample No.	Length (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)	Sb (%)	As (%)
D 6066	66.0∿67.0	4.8	57	0.12	0.14	3.33	0.01	2.92
D 6067	67.0∿68.0	0.6	12	0.04	0.01	1.03	0.00	2.15
D 6068	68.0∿70.0	0.6	18	0.03	0.05	0.57	0.00	0.28
D 6070	70.0∿72.0	0.1	6	0.01	0.01	0.10	0.00	0.03
D 6072	72.0∿74.0	2.6	30	0.07	0.03	1.80	0.01	3.18
D 6074	74.0∿75.9	4.6	36	0.07	0.05	3.02	0.00	1.21
D 6076	75.9∿78.0	0.2	9	0.03	0.01	0.78	0.00	0.04
D 6078	78.0∿80.0	tr	2	0.01	0.01	0.20	0.01	0.08
D 6080	80.0∿81.8	tr	tr	0.00	0.00	0.06	0.00	0.03
D 6082	81.8∿84.0	7.1	120	0.22	0.18	6.87	0.02	3.24
D 6084	84.0∿85.0	4.6	116	0.21	0.17	4.78	0.01	4.27
D 6086	85.8∿87.5	3.8	76	0.33	0.17	8.08	0.01	5.02
D 6087	87.5∿89.2	4.5	20	0.06	0.05	2.42	0.01	9.94
D 6090	89.2∿90.9	3.3	18	0.08	0.03	1.75	0.00	3.76
D 6091	90.9∿93.0	25.4	19	0.04	0.02	0.17	0.00	0.32
D 6093	93.0∿94.0	1.2	9	0.02	0.03	0.36	0.00	0.03
D 6094	94.0∿95.6	0.7	2	0.01	0.01	0.05	0.00	0.56
D 6096	95.6∿98.0	tr	tr	0.02	0.00	0.09	0.00	0.14
D 6098	98.0∿99.2	0.2	2	0.02	0.00	0.06	0.00	0.03
D 7053	53.2∿53.7	0.8	104	0.66	0.01	0.09	0.00	0.79
D 7099	99.0∿100.0	1.3	4	0.01	0.08	0.08	0.00	0.05
D 7132	132.0∿132.5	tr	tr	0.01	0.00	0.00	0.00	0.00
D 7135	135.6∿137.0	tr	tr	0.01	0.00	0.14	0.00	0.00
D 7137	137.0∿138.4	tr	tr	0.02	0.00	0.03	0.00	0.00
D 7138	138.4∿140.0	tr	14	0.11	0.00	0.01	0.00	0.01
D 7140	140.0∿141.6	0.2	28	0.23	0.00	0.02	0.00	0.04
D 7141	141.6∿142.2	tr	tr	0.01	0.00	0.00	0.00	0.01
D 7142	142.2∿143.1	0.2	16	0.06	0.00	0.10	0.00	0.03
D 7143	143.1∿145.1	7.0	92	0.22	0.11	10.91	0.02	12.63
D 7145	145.1∿146.5	1.4	22	0.07	0.02	2.31	0.00	0.52
D 7146	146.5∿147.7	2.2	16	0.06	0.00	0.73	0.00	0.02

A. Ⅱ-16 Microscopic Observation of the Thin Sections

Sample No.	Location	Macroscopic descriptions	Microscopic observations
D1006	PD-1	Green rock	Altered andesite Porphyritic texture This rock is identified as an igneous rock from its relic texture. Phenocryst : Mafic mineral, plagioclase. Mafic mineral (Max:2.5m/m) suffer from amphibole alteration, chloritization and calcitization with opaque mineral.
D1073	PD-1	Tuff breccia	Altered andesitic rock Porpyritic texture There are two part, that is, the one poor in phenocryst and the other abundant in phenocryst. The part poor in phenocryst, Phenocryst : Mafic mineral changes to psudomorph except the inner clinopyroxene part, and is filled with amphibode, epidote, chlorite, calcite and sericite. Plagioclase is replaced by anhedral quartz and epidote. Spherulitic part is filled with anhedral quartz and fine grained epidote. Groundmass : Clinopyroxene, epidote, chlorite and felsic mineral. The part abundant in phenocryst, Phenocryst : Cracked clinopyroxene rimmed with abundant epidote. Chlorite, sericite and amphibole occur along the crack. Groundmass : Acicular hornblende, sericite and granular opaque minerals, and chlorite.
D2051.2	PD-2	Tuff breccia	Andesitic rock Porpyritic texture Phenocryst : Plagioclase (Max:2.0m/m), mafic mineral. Plagioclase is cloudy with sericitization and potassic alteration. Mafic mineral also altered to sericite and chlorite.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
D2051.2	PD-2	ditto	Groundmass : Recrystallized and sericitized anhedral quartz and potassic feldespar. Along the epidote-hornblende vein (Max:2m/m in width), this rock is leucocratic due to silicification and mafic mineral is altered to amphibole.
D3069.5	PD-3	Tuff breccia	Altered rock This altered rock possibly from andesite and wholly altered to chlorite, calcite and sericite except the relict of felsic mineral (quartz). Calcite vein is present.
D3071.7	PD-3	Tuff breccia	Altered andesitic rock Porphyritic texture (?) Phenocryst : Mafic mineral (Clinopyroxene Max:7.0m/m), plagioclase (Max:4.0m/m). Mafic mineral is amphibolized and sericitized. Plagioclase also suffer from sericitization and weak chloritization. Groundmass : Acicular plagioclase and calcite, sericite, chlorite and epidote. Calcite vein (1m/m width) with opaque mineral is visible.
D5120	PD-5	Tuff breccia	Andesitic rock Phenocryst or fragment : Plagioclase, mafic mineral (clinopyroxene?). Plagioclase is intensily sericitized and mafic mineral suffer from calcitization and chloritization. Fine grained plagioclase, felsic mineral, chlorite and calcite constitute groundmass. Anhedral quartz filled spherulitic part. Quartz + calcite vein with opaque mineral develop.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
D6098	PD-6	Silicified vein	Altered rock Weak brecciate texture Fragment : Aggregation of quartz and sericite, sericite aggregates, aggregation of quartz and carbonate. Matrix : Quartz, sericite, carbonate. Quartz vein is accompanied a part with sphalerite.
D6102	PD-6	Green rock	Andesitic tuff breccia Brecciate, flow texture. Fragment : Andestic rock, clinopyroxene, plagioclase. Clinopyroxene suffers from amphibole alteration, sericitization and chloritization. Plagioclase is sericitized and cloudy. Matrix : Acicular plagioclase, chlorite and sericite. Some spherulitic parts are replaced by aggregation of quartz, feldspar sericite, epidote and chlorite.
D7080	PD-7	Tuff breccia	Altered andesite Porphyritic texture Phenocryst : Mafic mineral (clinopyroxene) Plagioclase (Max:6.0m/m) Mafic mineral is completely altered to amphibole and weakly to sericite and chlorite. Plagioclase suffers from sericitization, epidotization, and chloritization. Groundmass : Primary plagioclase laths and opaque mineral with abundant amphibole from clinopyroxene and acicular sericite. Sericite aggregates show patched form.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
D7126	PD-7	Agglomerate	Altered andesite Porphyritic texture Phenocryst : Clinopyroxene, plagioclase. Subhedral clinopyroxene (Max:6.0m/m) suffers from amphibolic alteration, sericitization and chloritization. Plagioclase also suffers from sericitization, chloritization, and calcitization. Groundmass : Primary plagiocalse laths and secondary granular amphibole, epidote, sericite, and chlorite. Limonitized opaque minerals are scattered. Locally sericite + hornblende + chlorite vein is visible.
D7160	PD-7	Tuff breccia	Andesitic tuff breccia Fragment : Andestic rock (Max:2.0cm in size), plagioclase, clinopyroxene. Mafic minerals in andestic fragment suffer from sericitization, chloritization and amphibolic alteration. Plagioclase is intensely sericitized and groundmass is composed of acicular plagioclase and microcrystalline mineral aggregates. Fragmental plagioclase and clinopyroxene suffer from sericitization and sericitization + amphibolic alteration respectively. Matrix : consists of sericite, chlorite and minute felsic minerals, locally shows flow structure.

A. Ⅱ-17 Microscopic Observation of the Polished Sections

Sample No.	Location	Macroscopic descriptions	Microscopic observations
D1006	PD-1	Pyrrhotite-magnetite ore	The constituent minerals are pyrrhotite and magnetite, with a little chalcopyrite. These occur as patch and dissemination. These show anhedral form and coexist closely.
D1016.7	PD-1	Fe-oxide ore	It is composed mainly of Fe-oxide, with a small amount of pyrite, a very small amount of chalcopyrite.
D3080.3	PD-3	Pyrite ore	It is composed mainly of pyrite, with a small amount of chalcopyrite. Pyrite in part is replaced by marcasite.
D5087	PD-5	Pyrite ore	It is composed mainly of pyrite, with a small amount of chalcopyrite. Pyrite includes a very small amount of pyrrhotite (20 to 30 μm in size), and partly is replaced by marcasite. One grain of electrum of 30 μm in size and several electrum of 1 μm to 3 μm in size are observed in gangue minerals.
D5108.8	PD-5	Pyrite-sphalerite ore	It is composed mainly of pyrite and sphalerite, with a small amount of arsenopyrite, chalcopyrite and galena. A part of pyrite is replaced by marcasite. Sphalerite includes chalcopyrite dots.
D6061	PD-6	Marcasite-pyrrhotite-chalcopyrite ore	The constituent minerals are marcasite, pyrrhotite and chalcopyrite, with a small amount of sphalerite and arsenopyrite. Three minerals of the former coexist closely, and fill the intergranule of crystals of gangue minerals and cracks.

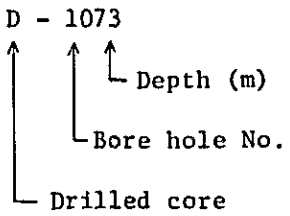
Sample No.	Location	Macroscopic descriptions	Microscopic observations
D6065	PD-6	Arsenopyrite-sphalerite ore	It is composed mainly of pyrite, arsenopyrite and sphalerite, with a small amount of chalcopyrite and galena. Sphalerite includes chalcopyrite dots. Galena is several decade to hundreds μm in size, and is included by pyrite.
D6073	PD-6	Arsenopyrite-sphalerite-pyrite-chalcopyrite ore	It is composed mainly of arsenopyrite, sphalerite, pyrite and chalcopyrite, with a little galena. Argentite (20 μm), polybasite (50 μm) and pyrargyrite (30 μm), which coexist chalcopyrite in pyrite, are observed. Sphalerite includes chalcopyrite dots. Galena includes stripe of boulangerite (width= 1 to 2 μm, length= 150 μm).
D6083	PD-6	Sphalerite-arsenopyrite-pyrite ore	The constituents are sphalerite, arsenopyrite and pyrite, with a very little galena and chalcopyrite. Sphalerite includes chalcopyrite dots. Galena is 100 μm to 300 μm in size, and is mostly included by pyrite.
D6086	PD-6	Pyrite-arsenopyrite-sphalerire ore	It is composed mainly of pyrite, arsenopyrite and sphalerite, and shows brecciated texture. Chalcopyrite, which surrounds the coarse pyrite of euhedral form, is cut by very fine-grained aggregates of pyrite. Sphalerite is cut and surrounded by very fine-grained aggregates of pyrite as well as chalcopyrite.
D7144	PD-7	Sphalerite-arsenopyrite ore	It is composed mainly of sphalerite and arsenopyrite, with a small amount of pyrite, and a very small amount of chalcopyrite and galena. Electrum (25 μm in size) with which coexists galena is observed at the margin of arsenopyrite.

Sample No.	Location	Macroscopic descriptions	Microscopic observations
D7145	PD-7	Arsenopyrite-sphalerite-pyrite ore	The constituent minerals are arsenopyrite, sphalerite and pyrite, with a small amount of chalcopyrite. Sphalerite includes chalcopyrite dots. Pyrite is partly replaced by marcasite.

A. II - 18 Photomicrographs

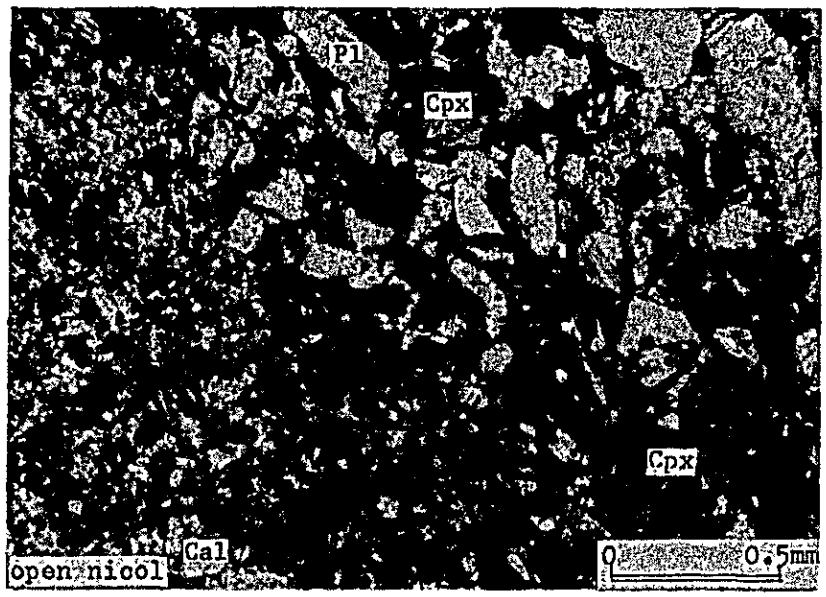
A. II-18-1 Thin Section

Sample No.	Rock Type
D-1073	Altered andesitic rock
D-2051.2	Andesitic rock
D-2051.2	Andesitic rock
D-3069.5	Altered rock
D-3071.7	Altered andesitic rock
D-7080	Altered andesite
D-7126	Agglomerate
D-7160	Andesitic tuff breccia



Abbreviations

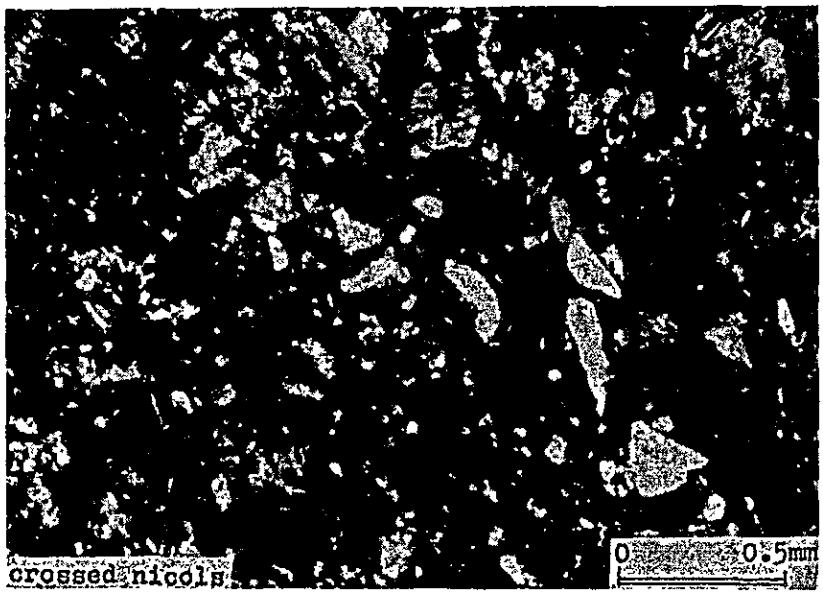
Pl : Plagioclase
Qz : Quartz
Ser : Sericite
Chl : Chlorite
Hb : Hornblende
Cpx : Clinopyroxene
Cal : Calcite
Ep : Epidote
Amp : Amphibole
And : Andesite

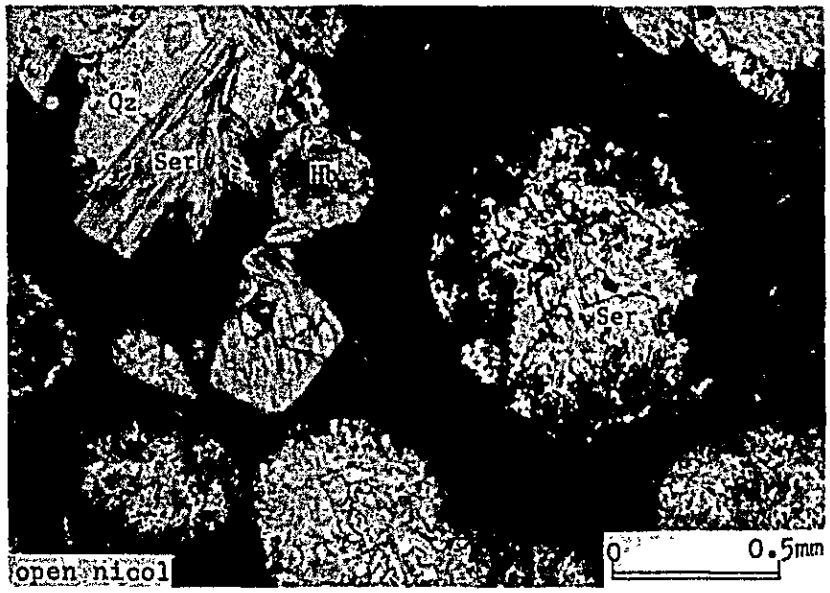


Sample No. D-1073

Rock type:

Altered andesitic rock

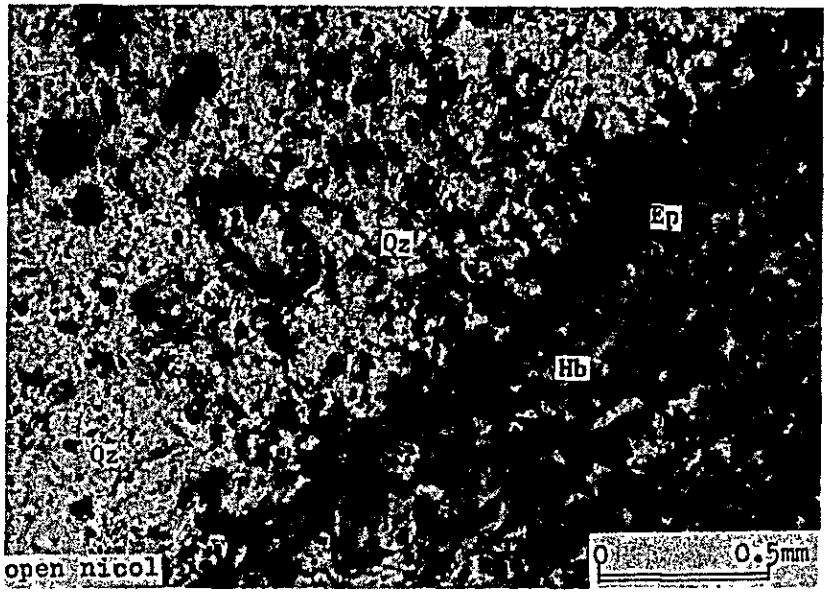




Sample No. D-2051.2

Rock type:

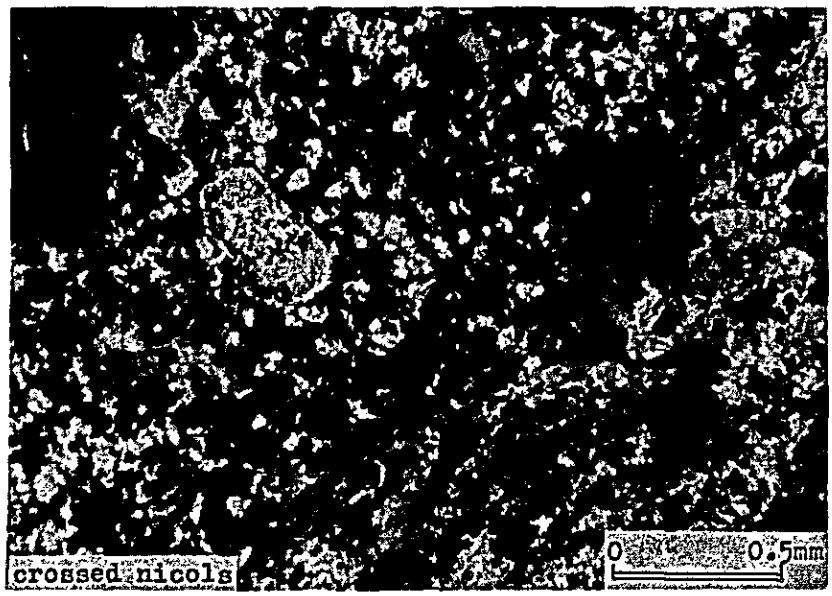
Andesitic rock

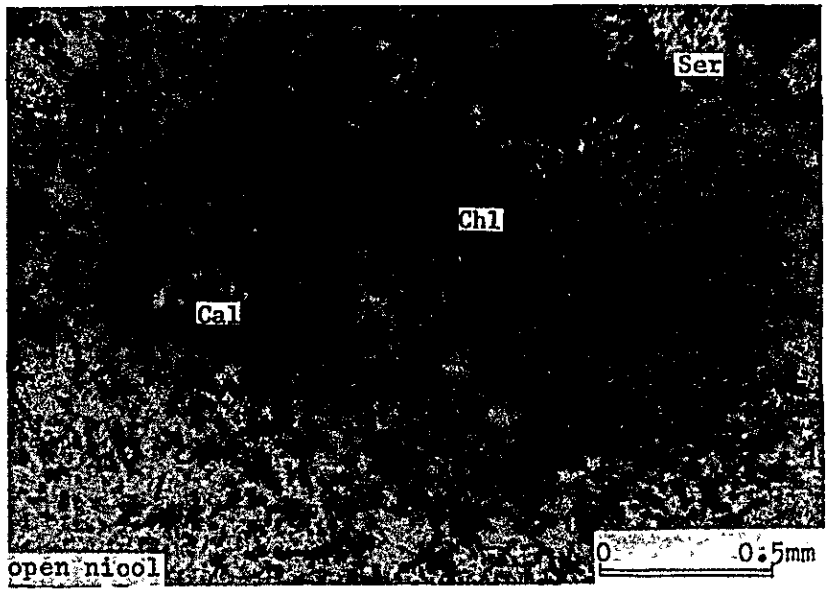


Sample No. 2051.2

Rock type:

Andesitic rock

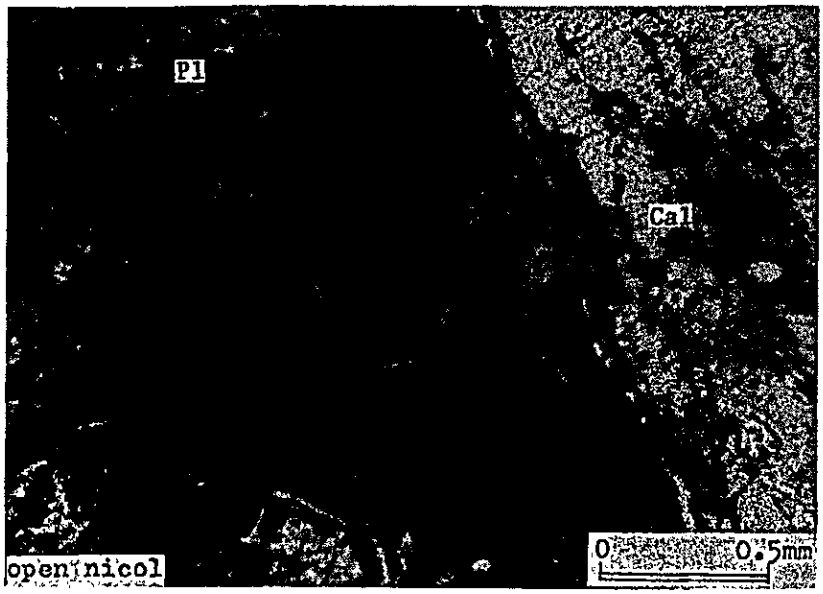




Sample No. D-3069.5

Rock type:

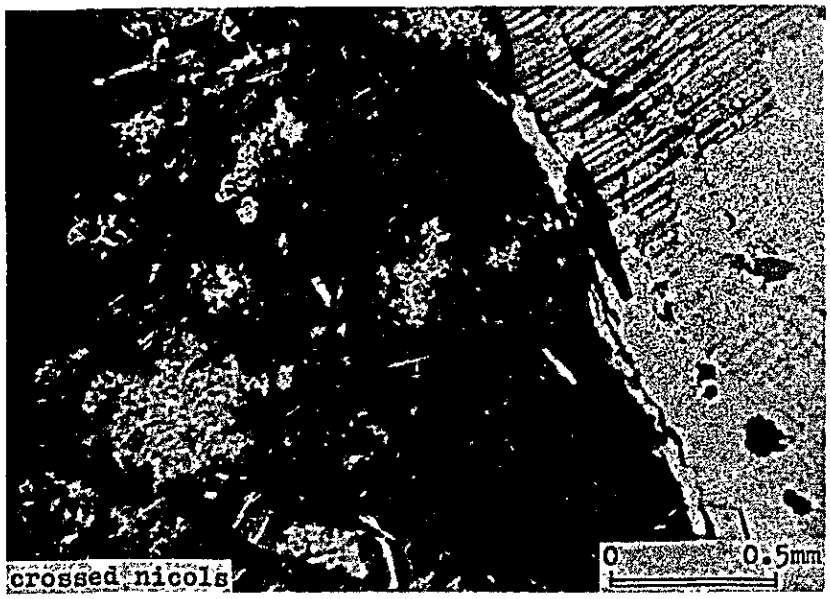
Altered rock

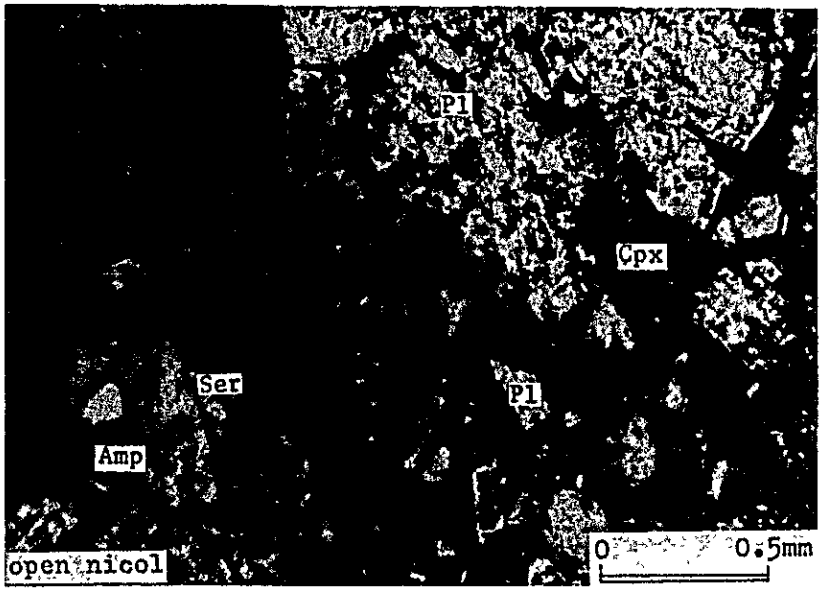


Sample No. D-3071.7

Rock type:

Altered andesitic rock

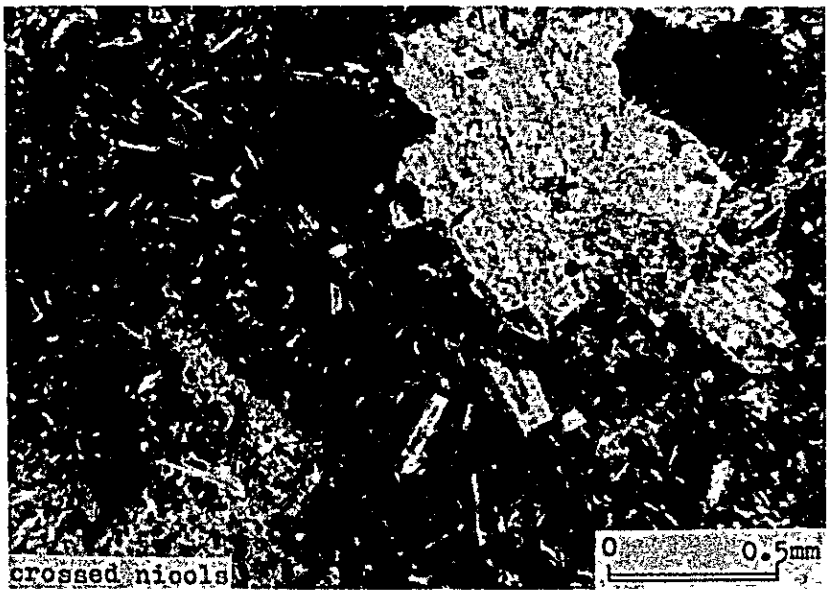


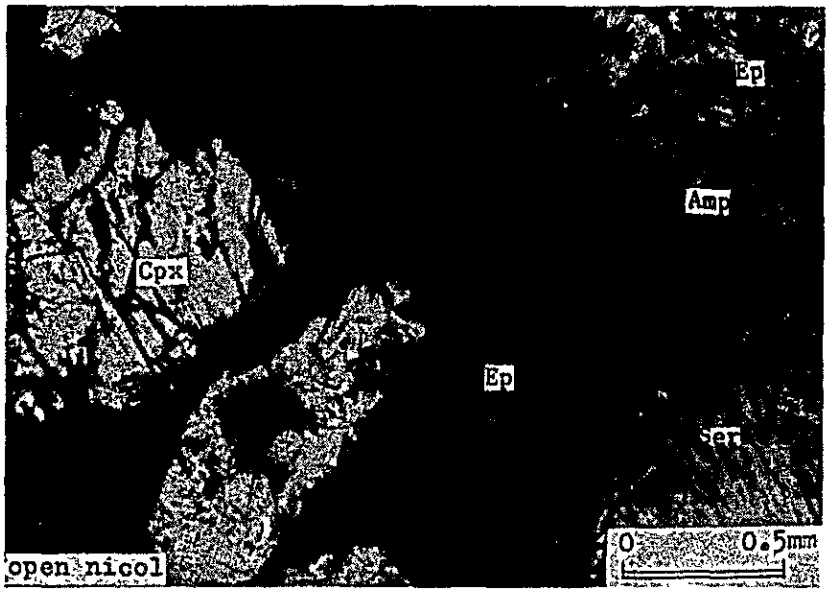


Sample No. D-7080

Rock type:

Altered andesite

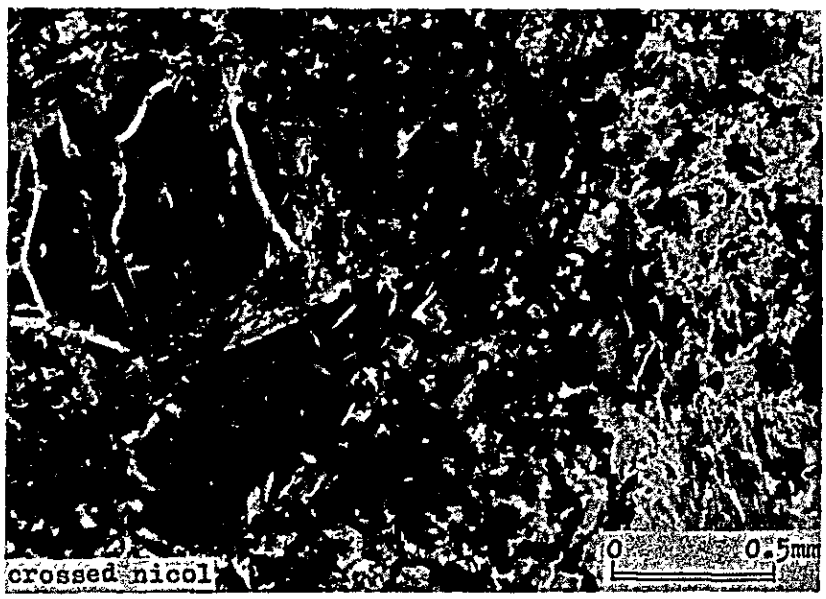


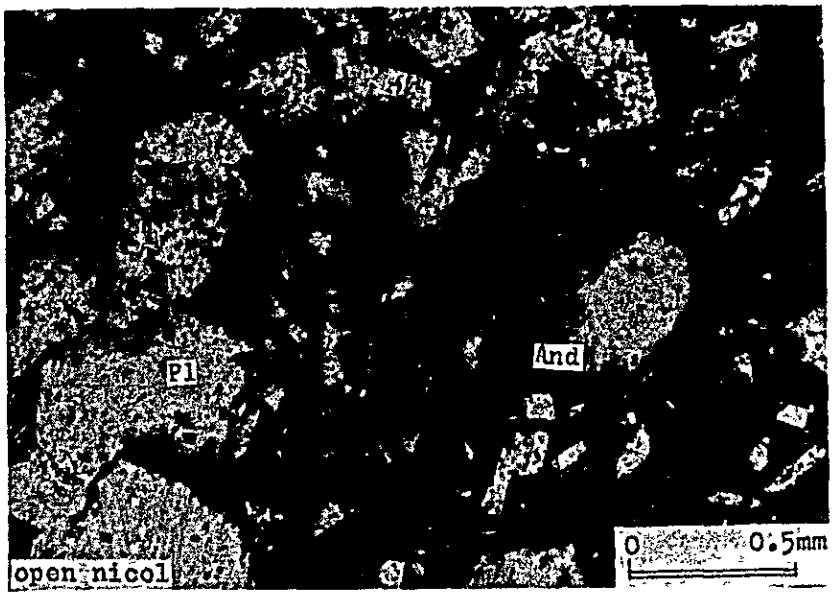


Sample No. D-7126

Rock type:

Agglomerate





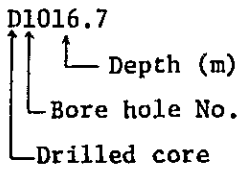
Sample No. D-7160

Rock type:

Andesitic tuff breccia

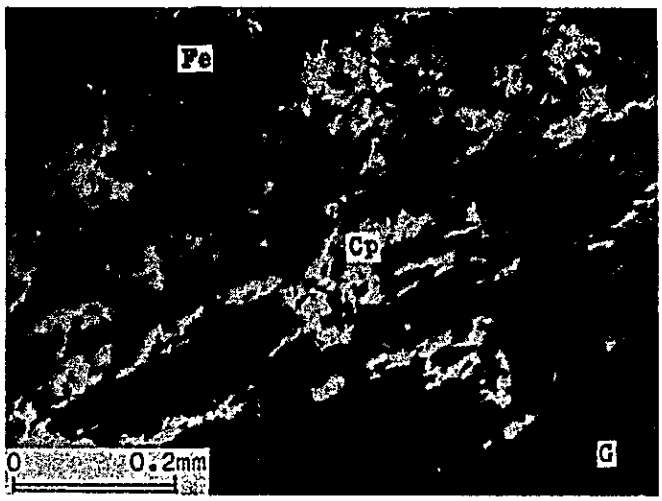
A. II - 18-2 Polished Section

Sample No.	Rock Type
D1016.7	Copper ore
D3080.3	Copper, gold ore
D5087	Copper, gold ore
D6073	Copper, lead, zinc ore
D6083	Copper, zinc, lead ore
D6086(A)	Zinc ore
D6086(C)	Copper, zinc ore
D6086(E)	Copper ore
D7144(A)	Gold ore
D7144(D)	Gold ore



Abbreviations

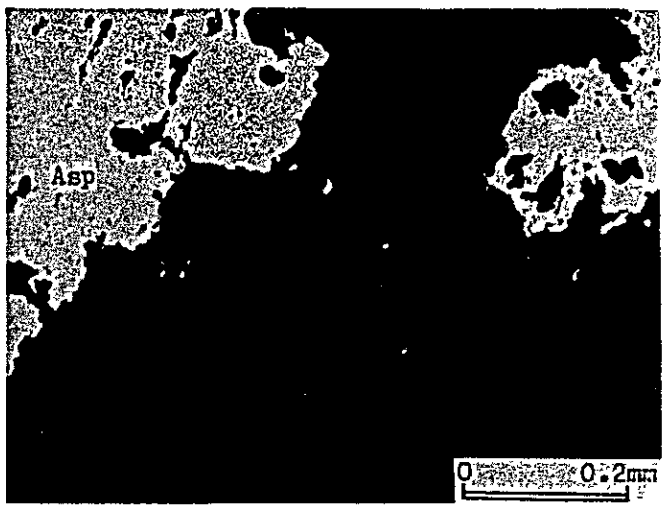
Py : Pyrite
Asp : Arsenopyrite
El : Electrum
Cp : Chalcopyrite
Sp : Sphalerite
Gn : Galena
Fe : Iron oxide
Bl : Boulangerite
G : Gangue mineral



Sample No. D1016.7

Rock type:

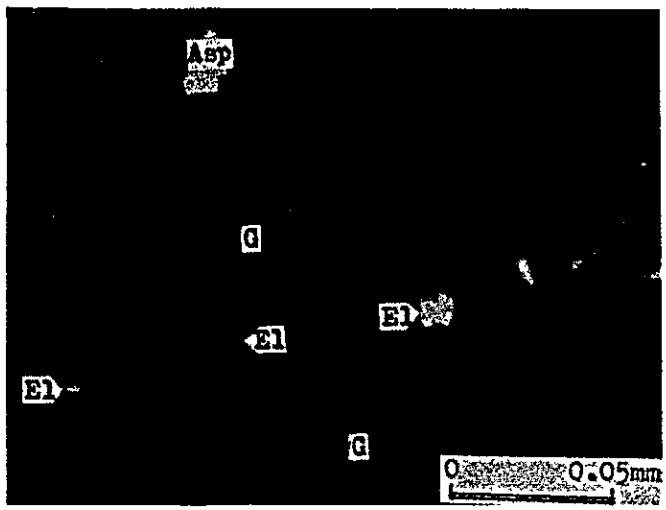
Copper ore



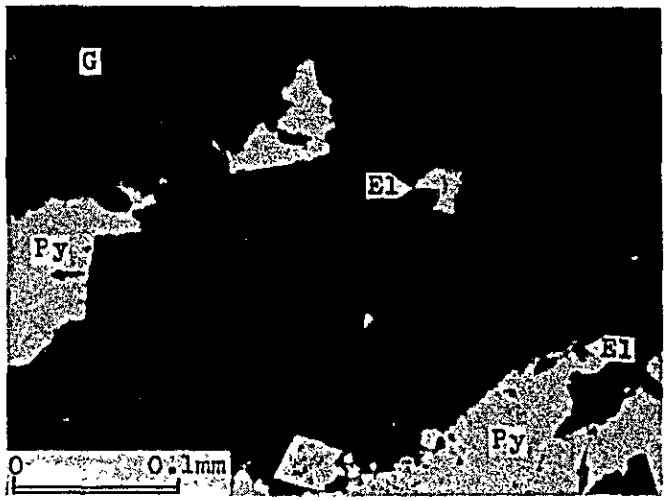
Sample No. D3080.3

Rock type:

Copper, gold ore



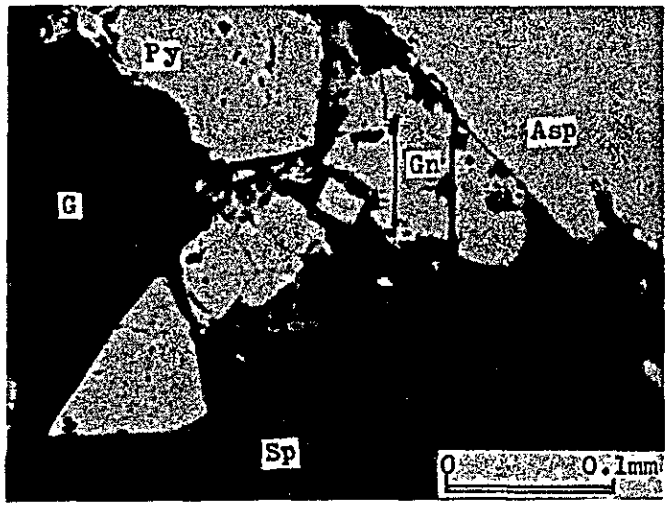
enlarged the above



Sample No. D5087

Rock type:

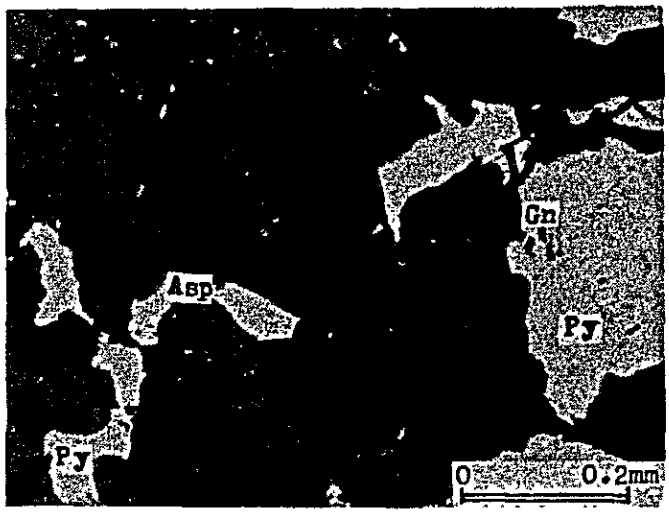
Copper, gold ore



Sample No. D6073

Rock type:

Copper, lead, zinc ore



Sample No. D6083

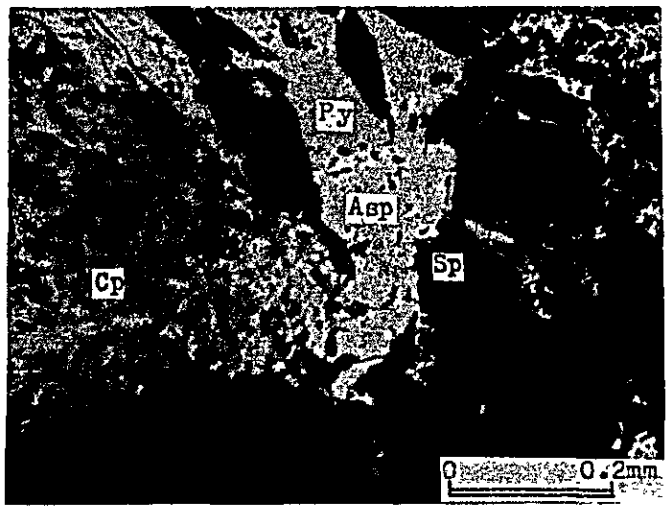
Rock type:

Copper, zinc, lead ore

Sample No. D6086(A)

Rock type:

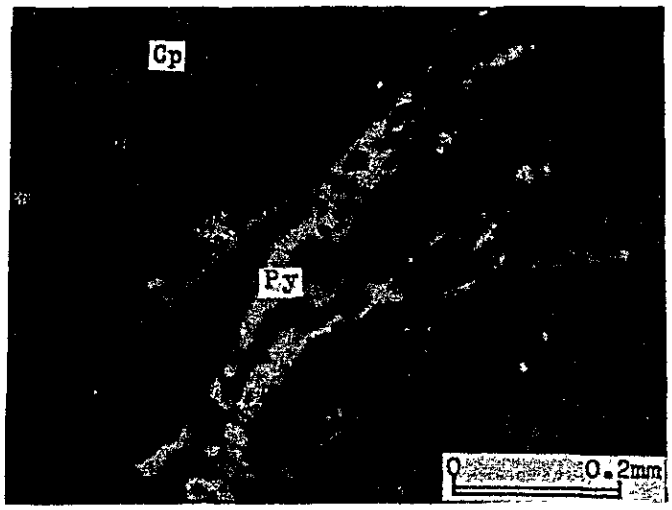
Zinc ore



Sample No. 6086(C)

Rock type:

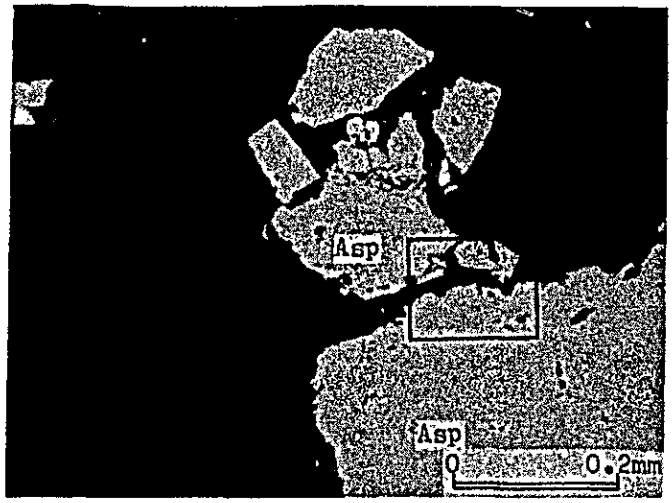
Copper, zinc ore



Sample No. D6086(E)

Rock type:

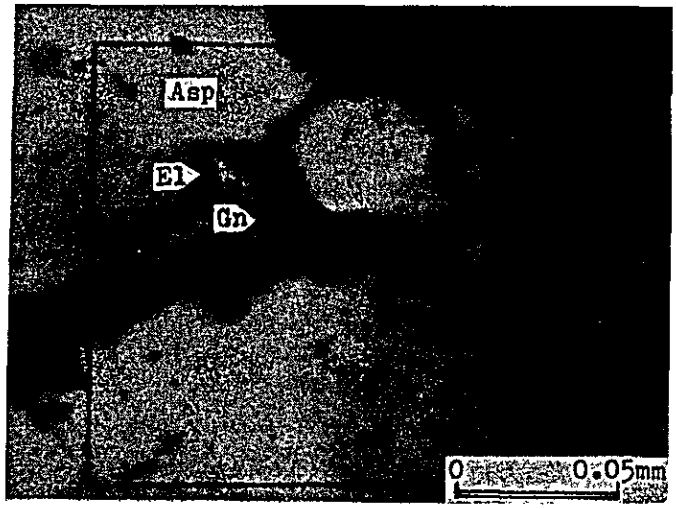
Copper ore



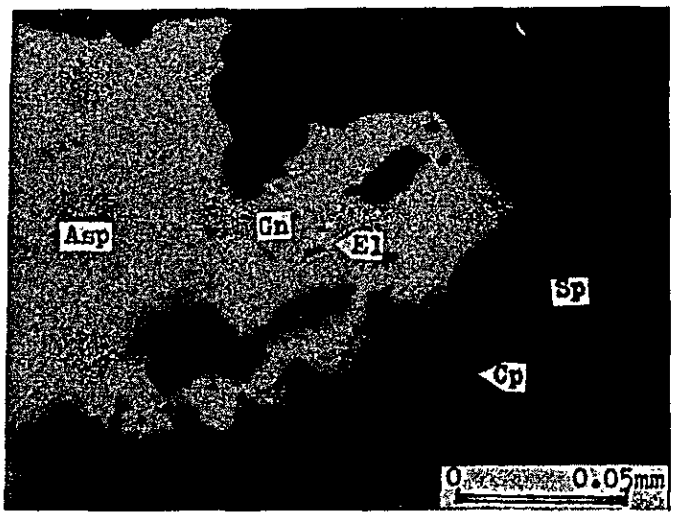
Sample No. D7144(A)

Rock type:

Gold ore



enlarged the above



Sample No. D7144(D)

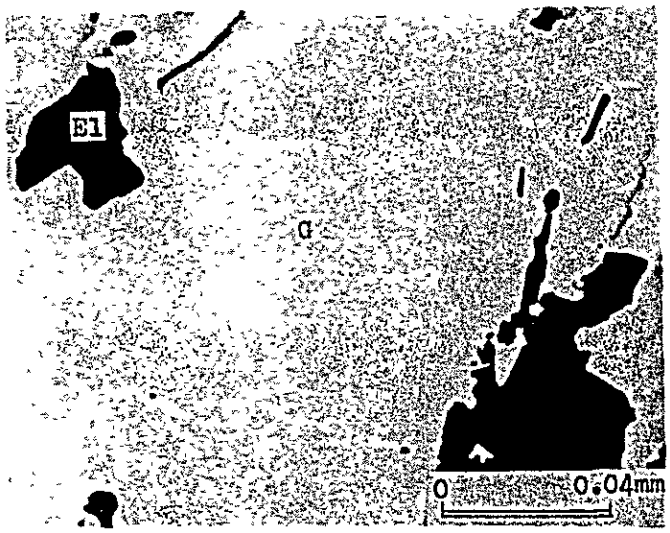
Rock type:

Gold ore

A. Ⅱ-18-3 EPMA

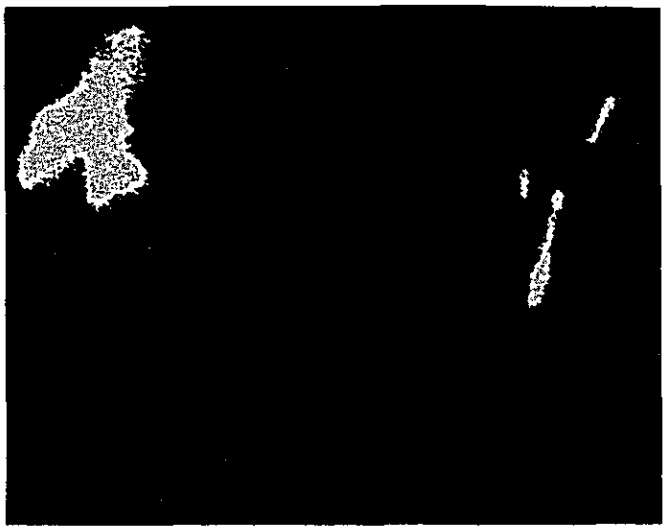
Abbreviations

Py : Pyrite
El : Electrum
Asp : Arsenopyrite
Gn : Galena
Bl : Boulangerite
Fr : Freibergite
Cp : Chalcopyrite
Ar : Argentite
Po : Pyrrhotite
G : Gangue mineral



Absorbed electron image

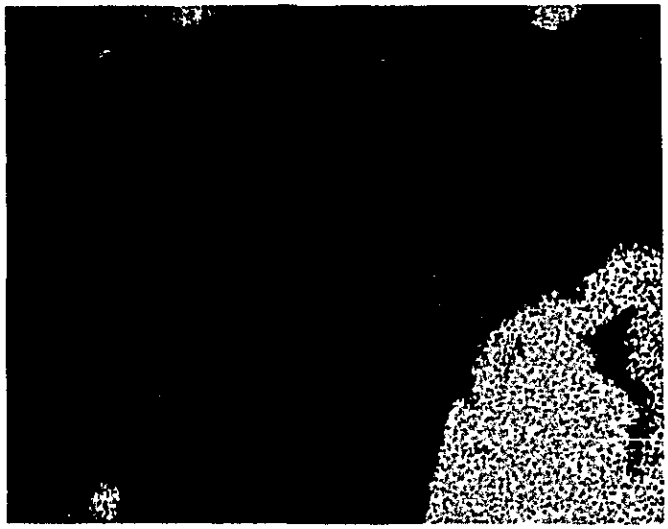
Electrums in gangue
(quartz vein)



Au X-ray image

Ag X-ray image

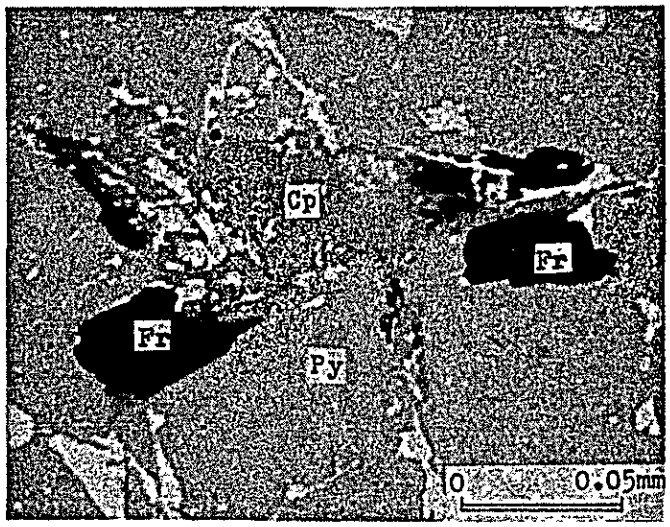
Sample No. : D5087
Locality : PD-5, at 87m
Accel. volt. : 25 kV
Absorb. elect. : 0.2 μA



Fe X-ray image

S X-ray image

(continuation of No.D5087)



Absorbed electron image

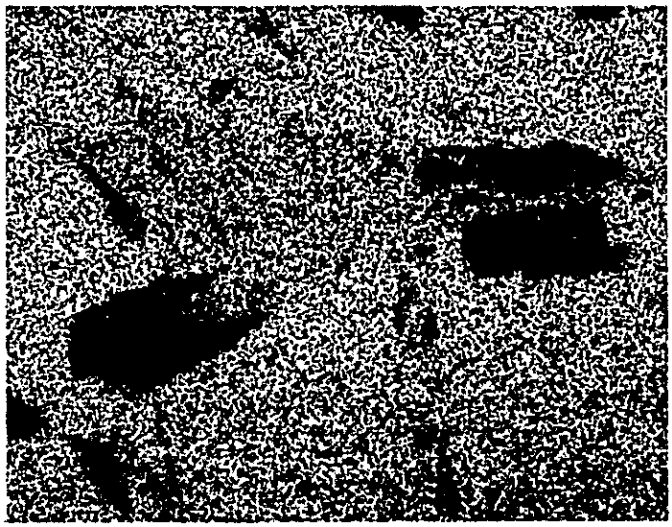
Freibergite associated with chalcopyrite in a crack of pyrite is observed.

Ag X-ray image

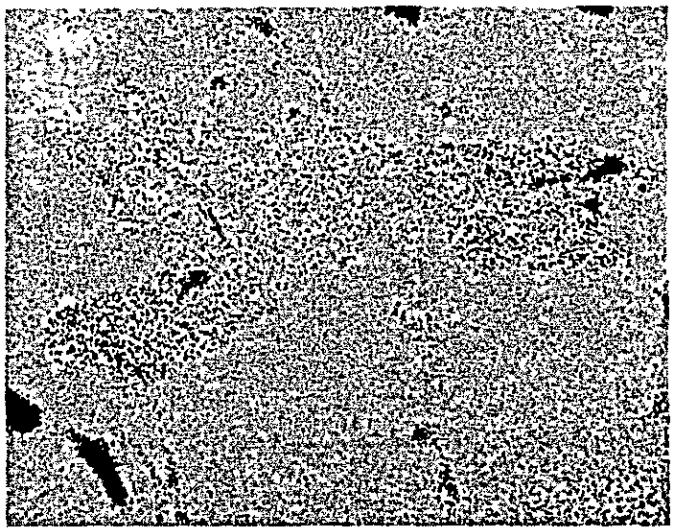
Sb X-ray image

Sample No. : D6073A
Locality : PD-6, at 73m
Accel. volt. : 15 kV
Absorb. elect. : 0.1 μA

Cu X-ray image

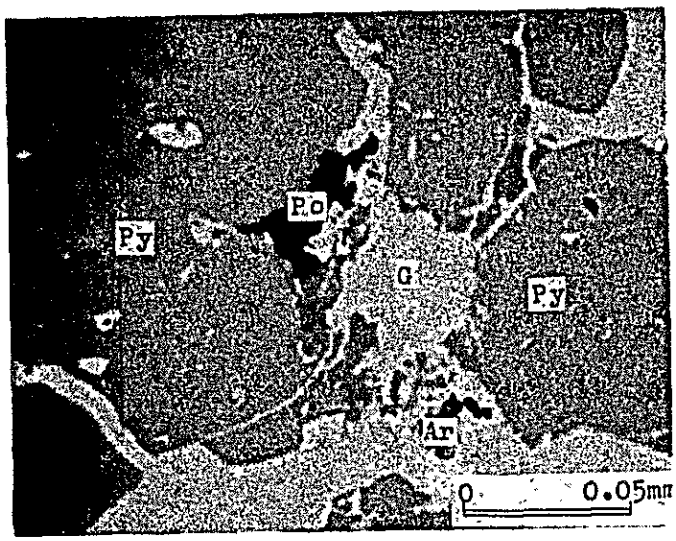


Fe X-ray image



S X-ray image

(continuation of No.D6073A)



Absorbed electron image

Polybasite [$(Ag, Cu)_{16}Sb_2S_{11}$] and Argentite are seen in fringe of pyrite, associating with chalcopyrite

Ag X-ray image

Sb X-ray image

Sample No. : D6073B
Location : PD-6,at 73m
Accel. volt. : 15 kV
Absorb. elect. : 0.1μA

Cu X-ray image

Fe X-ray image

S X-ray image

(continuation of No.D6073B)