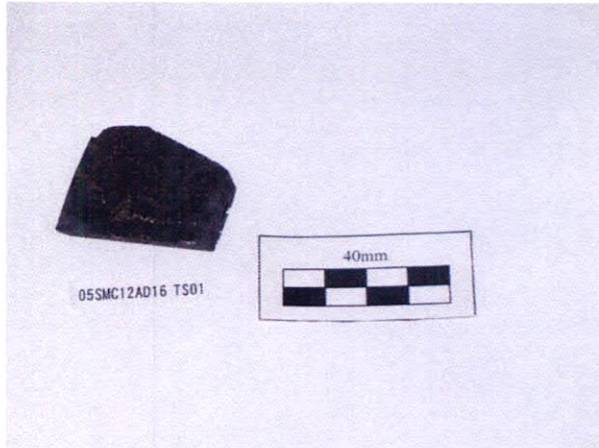


**Plate I Photographs of Samples**

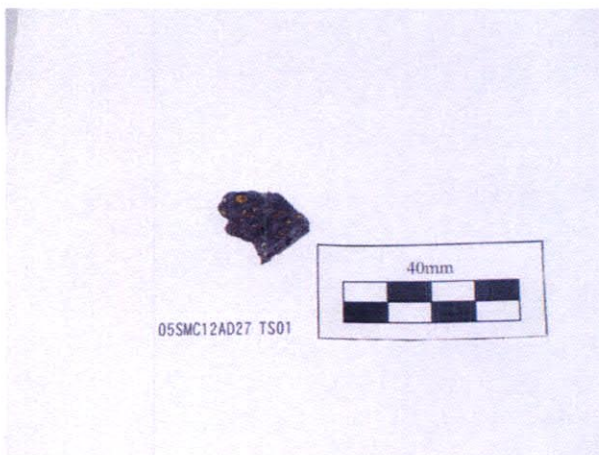
**Rock Samples of Thin Sections**



05SMC12AD16\_TS01



05SMC12AD19\_TS01



05SMC12AD27\_TS01









05SMC12AD29\_TS01



05SMC13AD15\_TS01



05SMC13AD16\_TS01

05SMC12AD15_PS01~PS04			
(cm)			PS01
			PS02
			PS03
			PS04
			<p>Botryoidal texture of 5mm across is observed on the surface, but it is not clear.</p> <p>Surface to 8cm: Black and massive, irregular and unclear fractures occur entirely. Along some of the fractures limonite occurs filling pores of 0.5mm across.</p> <p>(8cm)</p> <p>8cm to the end: Calcareous filling of 3 to 5mm across irregularly occur. Boundary to the upper unit is not clear. The amount of cookeries fillings increases toward below and reaches up to 40%.</p>
05SMC12AD16_PS01~PS04			
(cm)			PS01
			PS02
			PS03
			PS04
			<p>Botryoidal texture of 2cm across is observed on the surface.</p> <p>Surface to 4cm: Black and massive. Scattered occurrence of limonite is observed in network of 2 to 3mm wide bands and this continues to below.</p> <p>(4cm)</p> <p>4cm to the end: Irregular network, less than 1cm wide, of pale brownish gray cookeries fillings occur in black and massive manganese oxides. Amount of cookeries fillings increases toward below and reaches up to 30%. The contacts of manganese oxides and fillings are sometimes clear but mostly unclear.</p>
05SMC12AD29_PS06~PS07			
(cm)			PS01
			PS02
			<p>Surface to 5cm: Black and porous with irregular distribution of 2 to 3mm size pores. Limonite is attached in some of the pores.</p> <p>(5cm)</p>

Photograph of Cross Section Samples

**Plate II Descriptions of Thin sections**

**Descriptions Sheets and Micrographs**

Serial No: 01			
Sample No: 05SMC12AD16 TS01			
Rock Name: Basalt			
Hand Specimen: Brownish dark gray, aphyric basal. It shows intensive vesicularity with abundant vesicles of 2–3mm across. The vesicles are filled and coated by milky white to brown calcite and limonite. Cracks are occasionally filled by calcite veins of 1–2mm wide.			
Microscopic Observation			
Texture : intersertal, vesicular			
Phenocryst : Clinopyroxene, plagioclase and magnetite occur as phenocryst and they occupy 40 volume %.			
Mineral	Shape	Size	Volume %
Plagioclase	rectangular	0.1 ~ 0.2 mm	10 %
Magnetite	irregular	0.02 ~ 0.05 mm	10 %
Groundmass : intersertal			
Mineral	Shape	Size	Volume %
Plagioclase	rectangular	~ 0.02 mm	40 %
Glass	irregular	~ 0.2 mm	7 %
Alteration: intermediate			
Secondary Minerals : Limonite is clearly observed filling vesicles and interstices of grains. Calcite fills cracks of less than 0.5mm wide.			
Mineral	Shape	Size	Volume %
Limonite	irregular	—	20 %
Hematite	irregular	—	5 %
Calcite	spotted-vein	0.1 ~ 1 mm	3 %
			Descriptions
			in vesicles and interstices of grains
			mainly in vesicles
			in vesicles and along cracks

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Cross Nicol



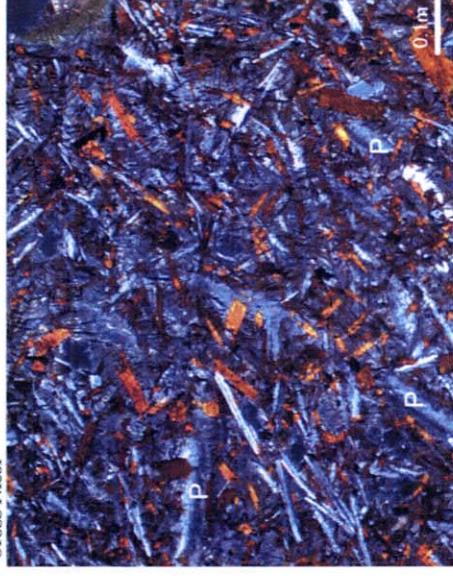
Pl: Plagioclase, Li: Limonite

Serial No: 02				
Sample No: 05SMC12AD19 TS01				
Rock Name: Basalt				
Hand Specimen: Brownish dark gray aphyric basalt. Vesicles of 0–3mm across occur showing vermicular texture. Vesicles are filled and coated by limonite. Brownish milky white calcite rarely occurs filling the vesicles.				
Microscopic Observation				
Texture : intersertal, vesicular				
Phenocryst : Plagioclase and Magnetite. They occupy 40 vol%.				
Mineral	Shape	Size	Volume %	Descriptions
Plagioclase	rectangular	0.2 ~ 0.8 mm	10 %	mostly altered.
Magnetite	Spotted-irregular	0.05 ~ 0.2 mm	10 %	scattered distribution.
Groundmass : intersertal				
Mineral	Shape	Size	Volume %	Descriptions
Plagioclase	rectangular	< 0.2 mm	50 %	mostly bleached and altered.
glass	irregular	—	3 %	partly limonitized.
Alteratio : intermediate				
Secondary Minerals :				
Thin film, 0.02–0.03mm thick, of limonite and hematite occur on the inner surface of vesicles.				
Mineral	Shape	Size	Volume %	Descriptions
Limonite	irregular	—	10 %	inner surface of vesicles and interstices
Hematite	irregular	—	3 %	inner surface of vesicles

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Cross Nicol



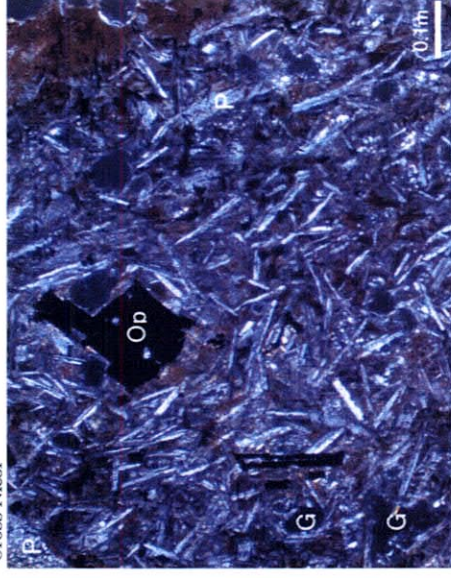
P: Plagioclase

Serial No: 03			
Sample No: 05SMC12AD27 TS01			
Rock Name: Aphyric Basalt			
Hand Specimen: Dark gray aphyric basalt with abundant vesicles. The vesicles are 2-3cm across and the amount of vesicles reaches to 40 volume% of whole rock. Limonite and carbonate occasionally occur attached on the inner surface of vesicles.			
Microscopic Observation			
Texture : aphyric, vesicular			
Abundant vesicles of 1 mm across.			
Phenocryst : Plagioclase and Magnetite			
Mineral	Shape	Size	Volume %
Plagioclase	rectangular	0.4 ~ 0.6 mm	5 %
Magnetite	anhedral	0.01 ~ 0.1 mm	5 %
Descriptions altered to brown color. scattered distribution.			
Groundmass : intersertal			
Mineral	Shape	Size	Volume %
Plagioclase	rectangular	< 0.01 mm	40 %
Glass	irregular	—	15 %
Descriptions weakly oxidized at the vicinity of vesicles.			
Alteratio : weak			
secondary Minerals :			
Weakly altered and hematite is rarely observed at the vicinity of vesicles.			
Mineral	Shape	Size	Volume %
Hematite	irregular	—	5 %
Descriptions occur at the vicinity of vesicles.			

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Cross Nicol



Pl: Plagioclase, G: Glass, Op: Opaque mineral

Serial No: 04			
Sample No: 05SMC12AD29 TS01			
Rock Name: Basalt			
Hand Specimen: Brown to dark gray, aphyric basalt. The color changes gradationally and vesicularity is poor. The vesicles usually have globular shape of 1–2cm across and are filled by limonite. Slightly large vesicles of 3mm across rarely occur. Angular fragments of pale brownish gray to milky white quartz and calcite, 3–4mm across are included.			
Microscopic Observation			
Texture : intersertal, vesicular			
Phenocryst : Mainly plagioclase.			
Mineral	Shape	Size	Volume %
Plagioclase	rectangular	0.6 ~ 1.2 mm	5 %
Magnetite (Pyrite ?)	spotted-irregular	0.05 ~ 0.2 mm	7 %
Groundmass : intersertal Texture is obscured by alteration.			
Mineral	Shape	Size	Volume %
Plagioclase	rectangular	0.1 ~ 0.04 mm	50 %
Alteratio : strong			
Secondary Minerals : Much of the phenocrysts and groundmass limonitized and original texture is not clear.			
Mineral	Shape	Size	Volume %
Goethite	irregular	—	3 %
Limonite	irregular	—	30 %
Calcite	spotted-irregular	0.02 ~ 1.5 mm	5 %

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P: Plagioclase, Li: Limonite



Serial No.: 05

Sample No: 05SMC13AD15 TS01

Rock Name: Agate

Hand Specimen: Colorless to reddish dark gray agate. In its inner part, it shows reddish dark gray, parallel, fibrous stripes of 3mm interval. Less than 5mm thick fragment of limestone is partly attached on the surface.

Microscopic Observation

Texture : aphanitic

Phenocryst :

Mineral	Shape	Size	Volume %	Descriptions

It is fine and compact, consisting of fine quartz grains of 0.01–0.03mm across. It is not clear but stripes of different color tone of 0.2–0.3mm wide are observed entirely. A few ovoidal voids filled by quartz mosaic are observed.

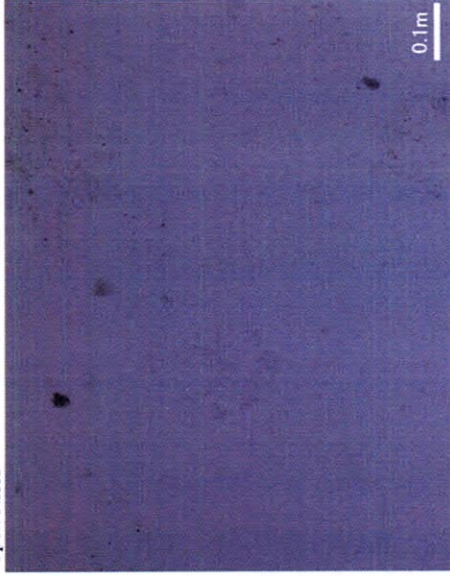
Mineral	Shape	Size	Volume %	Descriptions
Quartz	Spotted-irregular	0.02 ~ 0.03 mm	100 %	consists of fine, equigranular quartz grains.

Alteratio : —

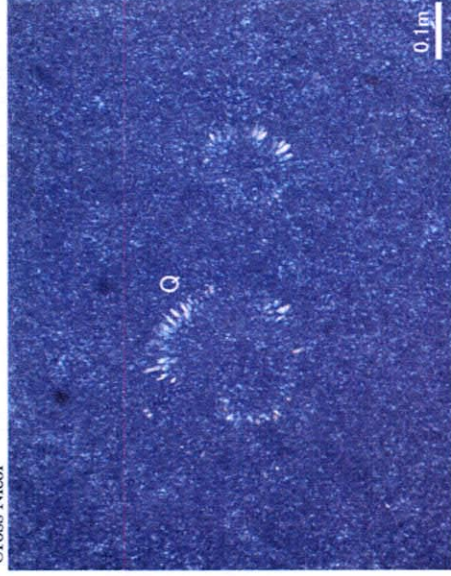
Secondary Minerals :

Mineral	Shape	Size	Volume %	Descriptions

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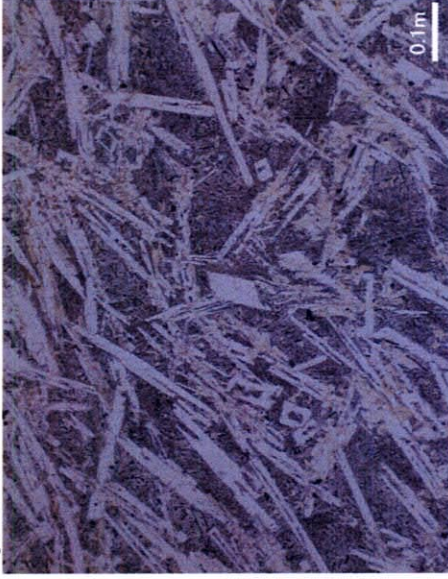
Cross Nicol



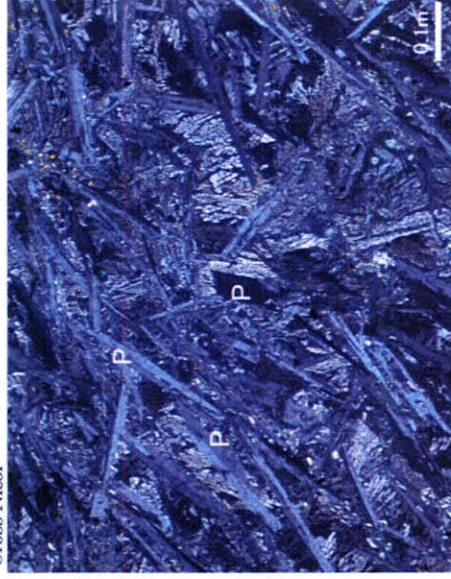
Q: Quartz

Serial No: 06			
Sample No: 05SMC13AD16 TS01			
Rock Name: Clinopyroxene Basalt			
肉眼観察 : Dark gray, pyroxene basalt with phenocrysts of less than 0.5mm across clinopyroxene and hypersthene. Rarely altered hornblende of less than 0.5mm across is observed. It is generally compact, but rarely less than 0.5mm across vesicles filled by milky white calcite and limonite are observed. It includes 3mm across, angular xenolith.			
Microscopic Observation			
Texture : intersertal, vesicular			
Phenocryst : almost completely limonitized.			
Mineral	Shape	Size	Volume %
Hornblende	spotted	0.2 ~ 0.4 mm	5 %
Plagioclase	rectangular	0.3 ~ 2 mm	5 %
Descriptions mostly altered and limonitized.			
Groundmass : intersertal			
Groundmass is mostly limonitized and only partly preserved.			
Mineral	Shape	Size	Volume %
Plagioclase	rectangular	0.01 ~ 0.03 mm	3 %
Descriptions mostly limonitized.			
Alteratio : intermediate			
Secondary Minerals :			
Phenocrysts and groundmass are limonitized. Calcite veins rarely occur.			
Mineral	Shape	Size	Volume %
Limonite	irregular	—	20 %
Goethite	irregular	—	3 %
Descriptions Pyroxene and partly plagioclase are limonitized.			

Open Nicol



Cross Nicol



P: Plagioclase