# MICROSCOPIC OBSERVATION OF ROCKS IN THIN SECTION

(Igneous Rock and Sedimentary Rock)

Summary of Microscopic Observation (Igneous Rocks) (1)

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Groundmass & Texture	Texture	Intergranular	itic	Seriate Intergranular	itic	itic	ı,	itic			Granular Medium-grained	Granular Fine-grained	Granular Medium-grained	Mosaic Medium-grained	Mosaic Medium-grained	Holocrystalline Fine-grained	Mosaic Coarse-grained
	ea H	ergr	Porphyritic	iate	Porphyritic Trachytic	Porphyritic Pilotaxitic	Granular	Porphyritic	Seriate	Aphyric	Granular Medium-g	Granular Fine-grai	unule	saic	saic	ocry e-gr	saic trse-
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2 1000 2 1	Rock Name	Camptonite	Camptonite	KR-018 Camptonite	KR-020A Trachyte	KR-020B Trachyte	Syenite	KR-021 Camptonite	KR-022 Sannaite	KR-023 Camptonite	Gabbro	KR-025B Nepheline Syenite	Gabbro	KR-027 Monzonite	Monzonite	Nephelinite	Nepheline Syenite
S		KR-009	KR-017				KR-020C Syenite	KR-021	KR-022	KR-023	KR-025A Gabbro		KR-026	KR-027	KR-028	KR-030	KR-031
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Summary of Microscopic Observation (Igneous Rocks) (2)

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ıre	Texture	Granular Coarse-grained	Coarse-grained	Granular Fine-grained	Flow-texture	Granular Fine-grained	Coarse-grained	Granular	Granular	Seriate	Porphyritic Fluidal		Porphyritic	Aphyric	Porphyritic Fluidal	Porphyritic Fluidal
Groundmass & Texture	Ca		,					<b>©</b>	<b>(</b>		اختست				<u> </u>	
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	PI	<b>0</b>	9	<b>*</b>				1				) )			0	0
	Rock Name	Nepheline Syenite	Nepheline Syenite	Nepheline Syenite	Ash-flow Tuff	Sandstone	KR-102A Barite Rock	KR-102B Calcite (1) Carbonatite	KR-102B Calcite (2) Carbonatite	Camptonite	Camptonite	Lapilli Tuff	Monchiquite	Spessartite	Andesite (	Andesite
Commit	No.	KR-032	KR-033	KR-034	KR-039	KR-101	KR-102A	KR-102B (1)	KR-102B (2)	KR-104	KR-106	KR-109	SH-34	SH-35	SH-36	SH-39
· }·	Code	17	18	13	20	21	22	23	24	25	26	27	28	29	30	31

"partial facies of alkaline igneous rocks

Summary of Microscopic Observation (Igneous Rocks) (3)

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	Note					* "agglomerate"					
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Secondary Minerals	Ca Chl NonLim Wm Opq Sm Se	1									7
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Groundmass & Texture	Texture			Granular	Mosaic Coarse-grained		Porphyritic Granular	Medium-grained Granular	Porphyritic Hyalopilitic	Porphyritic Hyalopilitic	
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	Rock Name	32 MR-106 Carbonatite	Syenite	34 MR-111 Nepheline Syenite	Nepheline Monzosyenite	36 MR-113 Lapilli Tuff	37 MR-114 Phonolite	MR-117 Nepheline Syenite	Camptonite	Camptonite	41 MW-03 Monchiquite
Jum 5	No.	MR-106	MR-108 Syenite	MR-111	MR-112	MR-113	MR-114	MR-117	39 MK-01	MK-26	MW-03
	Code	32	33	34	35	36	37	38	39	40	41

# \* partial facies of alkaline igneous rocks

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (1)

	Remarks				
d Minerals	Transparent minerals				
Unidentified Minerals	Opaque minerals	Magnetite			Magnetite < 1 %
	Identified minerals	<ul> <li>♦ PHENOCRYSTS</li> <li>No Hornblende , = 2%, stout prismatic, &lt; 1 mm</li> <li>Clinopyroxene , = 3%, long prismatic, &lt; 1.5 mm</li> <li>Titanite , &lt; 1%, wedge-shaped~rounded , &lt; 1 mm</li> </ul>	CAROUNDMASS <ul> <li>Plagioclase, alkari feldspar, opaque mineral,</li> <li>etc.: &gt; 90 %</li> </ul>	<ul> <li>◇PHENOCRYSTS</li> <li>Hornblende, = 5%, &lt; 4 mm</li> <li>Completely altered to carbonate, limonite, and chlorite.</li> <li>◇GROUNDMASS</li> <li>Mainly (&lt;70%) consists of thin plagioclase and alkali feldspar.</li> <li>Secondary carbonate and limonite (=20%)</li> </ul>	<ul> <li>◇PHENOCRYSTS</li> <li>Hornblende (bar-kevikite), ÷ 3 %, &lt; 5 mm</li> <li>Clinopyroxene , ÷ 5 %, &lt; 5 mm</li> <li>Plagioclase , ÷ 5 %, &lt; 1.5 mm</li> <li>Titanite , &lt; 1 %, &lt; 1 mm</li> <li>GROUNDMASS (÷ 85%)</li> <li>Hornblende, clinopyroxene, plagioclase, secondary carbonate</li> </ul>
Marmanninal factures and	microscopical texture and structure	<ul> <li>Dark gray, compact and hard</li> <li>Including lithic fragment</li> <li>Ophytic, fine-grained</li> <li>intergranular</li> </ul>		<ul> <li>Pale yellowish brown with pale brown long prismatic crystals rough surface</li> <li>Including altered tuff fragment</li> <li>Porphyritic, spherulitic</li> </ul>	• Medium gray • Compact and seriate • Intergranular
	Rock Name	CAMPTONITE (Carbonatized)		CAMPTONITE (Carbonatized)	CAMPTONITE
Somelo	Number	KR-009		KR-017	KR-018

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (2)

	Remarks	materials and an executive of the first of an information and the company of the first of the company of the co	
ed Minerals	Transparent minerals		
Unidentified Minerals	Opaque minerals	• Magnetite , < 1% granular ~ irregular , < 1 mm, altered to limonite. • Limonite , = 10%	
	Identified minerals	<ul> <li>◇PHENOCRYSTS</li> <li>Plagioclase , = 20 %, tabular or prismatio, completely altered to sericite, limonite and smectite</li> <li>Hornblende , &lt; 1 %, prismatic or tabular , &lt; 1.5 mm, completely replaced by limonite and smectite</li> <li>◇GROUNDMASS(&gt; 75%)</li> <li>Anorthoclase , = 60%, &lt; 0.5 mm</li> <li>Plagioclase , = 5 %</li> <li>Limonite, irregular</li> <li>Quartz, interstitial</li> <li>Titanite, granular</li> <li>Cristobalite, filling vesicles</li> </ul>	<ul> <li>◇PHENOCRYSTS</li> <li>Plagioclase, &lt; 7%, prismatic, &lt; 5mm, completely replaced by sericite, limonite and chlorite</li> <li>Hornblende, &lt; 5%, long prismatic ~ tabular , &lt; 1.5 mm, altered to limonite and smectite ~ nontronite</li> <li>◇GROUNDMASS (&gt; 85%)</li> <li>Anorthoclase, &lt; 0.5 mm, partially altered to sericite hornblende</li> <li>Smectite</li> <li>Smectite</li> <li>Plagioclase, interstitial</li> </ul>
Monte of the second sec	microscopical texture and structure	<ul> <li>Grayish orange pink and compact, with moderate reddish brown spots</li> <li>Porphyritic, trachytic</li> </ul>	Porphyritic, pilotaxitic
	Rock Name	ТRАСНУТБ	TRACHYTE
Commits	Number	KR-020A	KR-020B

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (3)

	Remarks			· ·										-			-							
Unidentified Minerals	Transparent minerals	• Aggregates of granular	limonite,	plagioclase	nate occur	within	feldspar	interstices of crystals.								*								
Unidentifi	Opaque minerals	• Magnetite	granular	, < 0.5 mm					• Mosenstite	. = 11%,	granular	, < 5 mm	some with	ragged	outline									
	Identified minerals	<ul> <li>Plagioclase,</li></ul>	<ul> <li>Alkali feldspar (cryptoperthite ~ microperthite)</li> </ul>	, = 50%, prismatic - tabular with	• Clinopyroxene, ≒ 5%, < 3 mm, marked zoning from	Ti-augite (core) to aegirine-augite (rim)	• Hornblende, ÷ 3%, prismatic ~ irregular, < 3 mm		Susadonaha	◆ Hornblende, = 5%, prismatic, tabular, acicular	, < 2 mm	Clinopyroxene,	prismatic, tabular, < 2 mm	<ul> <li>Titanite , &lt; 1 %, wedge-shaped, rectangular</li> </ul>	grain, < 0.5 mm	• Olivine ,<1%,<1 mm, replaced by nontronite	and mantled	(250 / SS 9 MUNITORS)	• Planioclase = 50% interstitia] < 1.5 mm	◆ Hornblende, = 10%; acicular ~ prismatic ~	granular, < 0.5 mm	<ul> <li>◆ Clinopyroxene, = 15%, prismatic ~ granular</li> </ul>	(top or rim altered to secondary minerals.)	<ul> <li>Secondary smectite, apatite, titanite and nepheline</li> </ul>
Magyananies festures and	microscopical texture and structure	<ul> <li>Very light gray with dark green spots</li> </ul>	Compact and hard	Granular					● Davly great	Compact and hard with black	needles and white patches	• Porphyritic												
	Rock Name	SYENITE							CAMPRONTER															
Somale	Number	KR-020C							KB 091	200					`									

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (4)

Rock Name   Macroscopical features and   Identified minerals   Opeque   Transparent   Remarks								-
Rook Name   Identified ninerals   Opaque   Transparent	Samuel		Monnechnical features and		Unidentifie	d Minerals		
SANNAITE • Dark gray	Number	Rock Name	microscopical texture and structure	Identified minerals	Opaque	Transparent	Remarks	-
SANNAITE • Dark gray • Hornblende, ≠ 10 %, long prismatic, short prismatic, fabular, < 3 mm • Clinopyrozene, ≠ 7%, long prismatic, short prismatic, < 3 mm • Clinopyrozene, ≠ 7%, long prismatic ~ short prismatic, < 3 mm • Clinopyrozene, ≠ 10 %, interstitial and clear < 1 mm • Alkali feldspar, > 50 %, altered to smectite, partially sericite • Clinopyrozene, ≠ 10 %, prismatic ~ granular • Titanite, small amount • Titanite, small amount • Almost aphyric • Granular • Granu					minerals	minerals		-
• Compact and hard • Porphyritic, seriate • Porphyritic, seriate • Clinopyroxene, ≒ 7%, long prismatic ~ short prismatic, < 3 mm	KR-022		• Dark gray	◇PHENOCRYSTS	• Magnetite			
• Porphyritic, seriate • Chinopyroxene, ≠ 7%, long prismatic ~ short prismatic, < 3 mm  ◇GROUNDMASS(≠ 80%) • Plagicolase, < 10 %, interstitial and clear < 1 mm • Alkali feldspar, > 50 %, alkered to smectite, partially sertice • Chinopyroxene, ≠ 10 %, prismatic ~ granular • Chinopyroxene, ≠ 10 %, prismatic ~ granular • Compact and hard • Apatite, small amount • Titanite, small amount • Titanite, small amount • Almost aphyric • Chinopyroxene, ≠ 2%, long prismatic ~ tabular • Chinopyroxene, ≠ 2%, long prismatic ~ tabular • Chinopyroxene, ≠ 10 %, acicular, prismatic, granular < 0.5 mm  ◇GROUNDMASS(> 95%) • Clinopyroxene, ≠ 10 %, acicular, prismatic, granular < 0.5 mm • Plagicolase, ≠ 60 %, replaced by smectite • Apatite as accessory mineral			Compact and hard	• Hornblende, = 10 %, long prismatic, short prismatic,	/ phenocryst:			
• Clinopyroxene, \$\Rightarrow{\text{\$\pi}\$, long prismatic, \$\Rightarrow{\text{\$\text{\$\pi}\$}}{\text{\$\pi}\$} \\ • Plagicolase, \$<10 \%, interstitial and clear <1 mm • Alkali feldspar, > 50 \%, altered to smectite, partially sericite • Clinopyroxene, \$\Rightarrow{\text{\$\pi}\$}{\text{\$\pi}\$}, scicular \$\sim \text{\$\text{\$\pi}\$}{\text{\$\pi}\$}, scicular \$\sim \text{\$\pi}\$ olivine • Apatite, small amount • Compact and hard • Apatite, small amount • Chmost aphyric • Chmost aphyric • Clinopyroxene, \$\Rightarrow{\pi}\$ 2\%, long prismatic, \$\text{\$\pi}\$ mm • Hornblende, \$\Rightarrow{\pi}\$ 1\%, long prismatic, \$\text{\$\pi}\$ mm • Clinopyroxene, \$\Rightarrow{\pi}\$ 2\%, scicular, prismatic, \$\text{\$\pi}\$ mm • Plagicolase, \$\Rightarrow{\pi}\$ 0\%, acicular, prismatic, \$\text{\$\pi}\$ mm • Plagicolase, \$\Rightarrow{\pi}\$ 0\%, replaced by smectite • Apatite as accessory mineral • Apatite as accessory mineral			• Porphyritic, seriate	tabular, < 3 mm	< 1%,			-
Prismatic, < 3 mm  ◇GROUNDMASS (≠ 80%)  • Plagociase, < 10 %, interstitial and clear < 1 mm  • Alkali feldspar, > 50 %, altered to smectite, partially serticte  • Clinopyroxene, ≠ 10 %, prismatic ~ granular  • Clinopyroxene, ≠ 10 %, prismatic ~ granular  • Flornblende, ≠ 7 %, acicular ~ short prismatic ~ granular  • Olivine	₹ <b>7</b>			• Clinopyroxene, = 7%, long prismatic - short	granular			all con-
<ul> <li>◇GROUNDMASS(≒80%)</li> <li>Plagicolase, &lt;10 %, interstitial and clear &lt; 1 mm</li> <li>Alkali feldspar, &gt; 50 %, altered to smectite, partially sericite</li> <li>Clinopyroxene, ≠10 %, prismatic ~ granular</li> <li>Hornblende, ≠7 %, acicular ~ short prismatic ~ granular</li> <li>Olivine ,&lt;1 %, &lt;1 mm replaced by nontronite</li> <li>Apattie, small amount</li> <li>Compact and hard</li> <li>Aphenooryxene, ≠2 %, long prismatic, &lt;8 mm</li> <li>Compact and hard</li> <li>Clinopyroxene, ≠10 %, acicular, prismatic, </li> <li>Clinopyroxene, ≠2 %, long prismatic, <a href="mailto:tabular">tabular</a></li> <li>Clinopyroxene, ≠10 %, acicular, prismatic, granular </li> <li>Clinopyroxene, ≠10 %, acicular, prismatic, granular </li> <li>Olinopyroxene, ≠3 %, acicular, prismatic, granular </li> <li>Olinopyroxene, ≠60 %, replaced by smectite</li> <li>Plagicolase, ≠60 %, replaced by smectite</li> <li>Apatite as accessory mineral</li> </ul>				prismatic, < 3 mm	< 0.5 mm		-	
O'GROUNDMASS(≠80%)  • Alkali feldspar, > 50%, altered to smectite, partially sericite • Clinoproxene, ≠ 10%, prismatic ~ granular • Clinoproxene, ≠ 10%, prismatic ~ granular • Compact and hard • Apatte, small amount • Titanite, small amount • Titanite, small amount • Compact and hard • Almost aphyric • Clinoproxene, ≠ 2%, long prismatic, < 8 mm • Clinoproxene, ≠ 10%, acicular, prismatic,					eroundmass:	-		-
Alkali feldspar, > 50 %, altered to smectite, partially sericite     Clinopyroxene, ≠ 10 %, prismatic ~ granular     Hornblende, ≠ 7%, acicular ~ short prismatic ~ granular     Olivine , < 1 %, < 1 mm replaced by nontronite     Apatite, small amount     Compact and hard     Apatite, small amount     Almost aphyric Clinopyroxene, ≠ 1 %, long prismatic ~ tabular     Compact and hard     Almost aphyric Clinopyroxene, ≠ 2 %, long prismatic ~ tabular     Compact and hard Chroublende, ≠ 1 %, long prismatic ~ tabular     Compact and hard Chroublende, ≠ 1 %, long prismatic ~ tabular     Compact aphyric Clinopyroxene, ≠ 10 %, acicular, prismatic, granular < 0.5 mm     Compact and controlled of 2 %, acicular, prismatic, granular < 0.5 mm     Plagioclase, ≠ 60 %, replaced by smectite     Apatite as accessory mineral				$\Diamond$ GROUNDMASS (= 80%)	, o c:			
• Aikali feldspar, > 50 %, altered to smectite, partially sericite • Clinopyroxene, ≠ 10 %, prismatic ~ granular • Hornblende, ≠ 7 %, acicular ~ short prismatic ~ fromblende, ≠ 1 %, acicular ~ short prismatic ~ fromblende, ≠ 1 %, acicular ~ short prismatic ~ fromblende, ≠ 1 %, long prismatic ~ tabular • Compact and hard • Apatite, small amount • Almost aphyric • Clinopyroxene, ≠ 1 %, long prismatic ~ tabular ~ (Clinopyroxene, ≠ 1 %, long prismatic, rabular ~ (Clinopyroxene, ≠ 1 %, long prismatic, granular ~ (Clinopyroxene, ≠ 10 %, acicular, prismatic, granular < (Clinopyroxene, ≠ 3 %, acicular, prismatic, granular < (Clinopyroxene, ≠ 3 %, acicular, prismatic, granular < (Clinopyroxene, ≠ 60 %, replaced by smectite • Apatite as accessory mineral	-			<ul> <li>Plagioclase, &lt; 10%, interstitial and clear &lt; 1 mm</li> </ul>	(			COMPAN-
• Clinopyroxene, ≠ 10 %, prismatic ~ granular • Hornblende, ≠ 7%, acicular ~ short prismatic ~ • Hornblende, ≠ 7%, acicular ~ short prismatic ~ • Olivine , < 1 %, < 1 mm replaced by nontronite • Apatite, small amount • Titanite, small amount • Titanite, small amount • Tompton on the small amount • Compact and hard • Compact and hard • Clinopyroxene, ≠ 1 %, long prismatic ~ tabular • Clinopyroxene, ≠ 10 %, acicular, prismatic, granular < 0.5 mm • Hornblende, ≑ 3 %, acicular, prismatic, granular < 0.5 mm • Plagioclase, ≠ 60 %, replaced by smeetite • Apatite as accessory mineral	,			• Alkali feldspar, > 50 %, altered to smectite, partially	/ Stational			-
• Clinopyroxene, ≠ 10 %, prismatic ~ granular • Hornblende, ≠ 7 %, acicular ~ short prismatic ~ granular • Olivine , < 1 %, < 1 mm replaced by nontronite • Apatite, small amount • Compact and hard • Almost aphyric • Almost aphyric • Almost aphyric • Clinopyroxene, ≠ 10 %, acicular, prismatic, granular < 0.5 mm				sericite				COURSE OF
• Hornblende, ≒ 7%, acicular ~ short prismatic ~ granular  • Olivine , < 1%, < 1 mm replaced by nontronite  • Apatite, small amount  • Titanite, small amount  • Titanite, small amount  • Tompact and hard  • Hornblende, ≒ 1%, long prismatic, < 8 mm  • Clinopyroxene, ≒ 2%, long prismatic ~ tabular  • Clinopyroxene, ≑ 2, mm  ◇GROUNDMASS (> 95%)  • Clinopyroxene, ≒ 10%, acicular, prismatic, granular < 0.5 mm, green aegirine-  augite is rare.  • Hornblende, ≒ 3%, acicular, prismatic, granular < 0.5 mm  • Plagioclase, ≒ 60%, replaced by smectite  • Apatite as accessory mineral	- 下 - 人 			• Clinopyroxene, = 10 %, prismatic ~ granular				-
e Olivine , < 1 %, < 1 mm replaced by nontronite  • Apatite, small amount  • Titanite, small amount  • Titanite, small amount  • Compact and hard  • Hornblende, ≒ 1 %, long prismatic, < 8 mm  • Almost aphyric  • Clinopyroxene, ≒ 2%, long prismatic ~ tabular  • Clinopyroxene, ≒ 10 %, acicular, prismatic,  granular < 0.5 mm  • Hornblende, ≒ 3 %, acicular, prismatic, granular < 0.5 mm  • Plagioclase, ≒ 60 %, replaced by smectite  • Apatite as accessory mineral				<ul> <li>Hornblende,</li></ul>	:			
• Olivine , < 1%, < 1 mm replaced by nontronite • Apatite, small amount • Titanite, small amount • Titanite, small amount • Compact and hard • Compact and hard • Hornblende, ÷ 1%, long prismatic, < 8 mm • Almost aphyric • Clinopyroxene, ÷ 2%, long prismatic ~ tabular (				granular			188	-
• Apatite, small amount  • Titanite, small amount  • Compact and hard • Hornblende, ≒ 1 %, long prismatic, < 8 mm • Clinopyroxene, ≒ 2 %, long prismatic ~ tabular  • Almost aphyric • Clinopyroxene, ⇒ 2 %, long prismatic, tabular  ⟨ GROUNDMASS (> 95%) • Clinopyroxene, ⇒ 10 %, acicular, prismatic, granular < 0.5 mm  • Hornblende, ⇒ 3 %, acicular, prismatic, granular < 0.5 mm  • Plagioclase, ⇒ 60 %, replaced by smectite • Apatite as accessory mineral							-	-
<ul> <li>Titanite, small amount</li> <li>CAMPTONITE</li> <li>Compact and hard</li> <li>Hornblende, ≑ 1 %, long prismatic, &lt; 8 mm</li> <li>Almost aphyric</li> <li>Clinopyroxene, ≑ 2 %, long prismatic ~ tabular</li> <li>CROUNDMASS (&gt; 95%)</li> <li>Clinopyroxene, ≑ 10 %, acicular, prismatic, granular &lt; 0.5 mm, green aegirine-augite is rare.</li> <li>Hornblende, ≑ 3 %, acicular, prismatic, granular &lt; 0.5 mm</li> <li>Plagioclase, ≑ 60 %, replaced by smectite</li> <li>Apatite as accessory mineral</li> </ul>				• Apatite, small amount				-
• Dark gray • Compact and hard • Almost aphyric • Clinopyroxene, ≒ 1 %, long prismatic, < 8 mm • Clinopyroxene, ≒ 2 %, long prismatic ~ tabular • Clinopyroxene, ≒ 2 %, long prismatic, tabular • Clinopyroxene, ≒ 10 %, acicular, prismatic, granular < 0.5 mm, green aegirine- augite is rare • Hornblende, ≒ 3 %, acicular, prismatic, granular < 0.5 mm • Plagioclase, ≒ 60 %, replaced by smectite • Apatite as accessory mineral				• Titanite, small amount				-
or Hornblende, ≑ 1%, long prismatic, < 8 mm or Clinopyroxene, ≑ 2%, long prismatic ~ tabular , < 2 mm ⟨ GROUNDMASS (> 95%) or Clinopyroxene, ≑ 10%, acicular, prismatic, granular < 0.5 mm, green aegirine- augite is rare. or Hornblende, ≑ 3%, acicular, prismatic, granular < 0.5 mm or Plagioclase, ⇒ 60%, replaced by smectite or Apatite as accessory mineral	KR-023	CAMPTONITE	• Dark gray		• Magnetite			-
<ul> <li>Clinopyroxene, ÷ 2%, long prismatic ~ tabular</li> <li>&lt; 2 mm</li> <li>&lt; GROUNDMASS (&gt; 95%)</li> <li>Clinopyroxene, ÷ 10%, acicular, prismatic, granular &lt; 0.5 mm, green aegirine-augite is rare.</li> <li>Hornblende, ÷ 3%, acicular, prismatic, granular &lt; 0.5 mm</li> <li>Plagioclase, ÷ 60%, replaced by smectite</li> <li>Apatite as accessory mineral</li> </ul>			Compact and hard	• Hornblende, = 1%, long prismatic, < 8 mm	/ phenocryst:/		-	MARKET !
c, aegirine- anular <	_		• Almost aphyric	<ul> <li>Clinopyroxene,</li></ul>	/ <1%,		-	-
c, c, legirine-					angular		-	-
c, segirine-				♦GROUNDMASS(> 95%)	< 0.5 mm			-
segirine- anular <				• Clinopyroxene, = 10 %, acicular, prismatic,	· groundmass:/			-
<ul> <li>augite is rare.</li> <li>Hornblende, = 3%, acicular, prismatic, granular </li> <li>0.5 mm</li> <li>Plagioclase, = 60%, replaced by smectite</li> <li>Apatite as accessory mineral</li> </ul>			Ma <sub>1</sub>	granular < 0.5 mm, green aegirine-	2 2%			-
<ul> <li>Nornblende, ÷ 3 %, acicular, prismatic, granular </li> <li>0.5 mm</li> <li>Plagioclase, ⇒ 60 %, replaced by smectite</li> <li>Apatite as accessory mineral</li> </ul>				augite is rare.				****
0.5 mm  • Plagioclase, = 60%, replaced by smectite  • Apatite as accessory mineral				• Hornblende, = 3 %, acicular, prismatic, granular <				-
<ul> <li>Plagioclase, ⇒ 60%, replaced by smectite</li> <li>Apatite as accessory mineral</li> </ul>	:			0.5 mm	1.		-	معهج
• Apatite as accessory mineral				<ul> <li>Plagioclase, = 60 %, replaced by smectite</li> </ul>				
				<ul> <li>Apatite as accessory mineral</li> </ul>				- cuspic

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (5)

				Unidentifie	Unidentified Minerals	
Sample Number	Rock Name	Macroscopical features and microscopical texture and structure	Identified minerals	Opaque minerals	Transparent minerals	Remarks
KR-025A	CLINO PYROXENE- HORNBLENDE GABBRO	<ul> <li>Light bluish gray base with brownish dark gray crystals</li> <li>Compact and hard</li> <li>Very heterogeneous</li> <li>Medium-grained</li> <li>Granular</li> </ul>	<ul> <li>Hornblende, = 40%, &lt; 5 mm inclusion of apatite, biotite, magnetite, clinopyroxene and titanite</li> <li>Clinopyroxene, = 20%, &lt; 5 mm, zoning, inclusion of apatite and magnetite</li> <li>Plagioclase, = 30%, &lt; 5 mm, with inclusion of apatite, titanite, hornblende, clinopyroxene and magnetite, (sericite as alteration product)</li> <li>Alkali feldspar, = 1%, &lt; 1 mm, cryptoperthite</li> <li>Biotite , &lt; 1%, &lt; 1 mm</li> <li>Titanite , = 1%, &lt; 1 mm, wedge-shaped with inclusion of magnetite and apatite inclusion of magnetite and apatite</li> <li>Apatite , &lt; 1%, &lt; 5 mm, prismatic</li> </ul>	• Magnetite, < 1%, < 0.5 mm, irregular		• Melanocratic part of KR-025
KR-025B	NEPHELINE SYENITE	<ul> <li>Fine-grained</li> <li>Granular</li> <li>Alkali feldspar vein</li> </ul>	<ul> <li>Alkali feldspar, = 40 %, &lt; 2 mm, cryptoperthite, dusty</li> <li>Plagioclase , = 20 %, &lt; 3 mm</li> <li>Nepheline , = 25 %, granular &lt; 1 mm</li> <li>Hornblende , = 3 %, prismatic ~ tabular, &lt; 2 mm</li> <li>Clinopyroxene , = 8 %, &lt; 3 mm, aegirine-augite</li> <li>Titanite , &lt; 1 %, &lt; 1 mm, wedge-shaped</li> <li>Apatite , rare, &lt; 0.5 mm, prismatic</li> <li>Fluorite , &lt; 1 %, &lt; 0.5 mm, interstitial</li> </ul>	• Magnetite,  = 2 %,  < 0.5 mm,  granular ~  irregular		• Leucocratic part of KR-025
KR-026	HORNBLENDE GABBRO	Abundant brownish black crystals in light gray matrix     Compact     Medium-grained     Granular	<ul> <li>Hornblende, = 45 %, 0.2 ~ 1.5 mm, including apatite, magnetite and titanite grains, and biotite flakes, some with clinopyroxene core</li> <li>Plagioclase, = 40 %, 0.4 ~ 0.5 mm</li> <li>Alkali feldspar, &lt; 1 %, &lt; 0.5 mm</li> <li>Quartz ; &lt; 2 %, &lt; 0.5 mm, interstitial</li> </ul>	• Magnetite <1.%, <0.5 mm, irregular		

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (6)

	Remarks			
d Minerals	Transparent minerals			
Unidentified Minerals	Opaque minerals		• Magnetite, < 1%, < 0.5 mm, irregular  • Magnetite, < 1%, < 0.5 mm, granular, irregular	
	Identified minerals	<ul> <li>Clinopyroxene, &lt;1%, &lt;2 mm,</li> <li>Biotite, &lt;1%, &lt;2 mm, flaky</li> <li>Titanite, &lt;1%, &lt;2 mm, wedge-shaped, inclusion of biotite and magnetite</li> </ul>	<ul> <li>Plagioclase, &gt; 60 %, 2 ~ 10 mm, exsolving alkali feldspar.</li> <li>Alkari feldspar, = 35 %, 2 ~ 5 mm, exsolving plagioclase</li> <li>Hornblende, = 2 %, &lt; 3 mm</li> <li>Biotite, &lt; 1 %, &lt; 2 mm</li> <li>Titanite, &lt; 1 %, &lt; 1 mm, short prismatic</li> <li>Apatite</li> <li>Apatite</li> <li>Smectite (secondary)</li> <li>White mica (secondary)</li> <li>Plagioclase, = 40 %, &lt; 2 ~ 6 mm</li> <li>Alkali feldspar, = 50 %, microperthite ~ cryptoperthite ~ microcline</li> <li>Hornblende, = 8 %, &lt; 3 mm, some with clinopyroxene core, inclusion of apatite, biotite, magnetite</li> <li>Titanite, &lt; 1 %, &lt; 1.5 mm, mantled with opaque materials</li> </ul>	<ul> <li>Aggregate of opaque, titanite and carbonate</li> <li>Apatite, small, rare, prismatic</li> </ul>
Marrosconical fasturas and	microscopical texture and structure	Andrew Control of the	<ul> <li>Leucocratic (pinkish gray)</li> <li>Gompact</li> <li>Mosaic</li> <li>Medium-grained</li> <li>Leucocratic (pinkish gray)</li> <li>Compact</li> <li>Mosaic</li> <li>Medium-grained</li> </ul>	
	Rock Name		MONZONITE	
Samula	Number	(KR-026)	KR-027	

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (7)

	Remarks														;											<u></u>
Unidentified Minerals	Transparent minerals																									
Unidentifie	Opague minerals	• Hematite,	rare,	granular,	prismatic					:							• Magnetite,	rare,	irregular							
		◇PHENOCRYSTS	$ullet$ Nepheline, scarce, $0.5 \sim 1$ mm, tabular, with	cancrinite in cracks and rims	<ul> <li>Clinopyroxene, scarce, &lt; 1.5 mm, long prismatic ~</li> </ul>	granular, partially altered to nontronite	<ul> <li>Titanite, rare, &lt; 0.5 mm, wedge-shaped, irregular</li> </ul>	A CONTRACT OF THE CONTRACT OF	♦ GRANDMASS (= 99%)	v depreme y / (0.00 mm m m m m m m m m m m m m m m m m	• Cancinute, = 5%	• Clinopyroxene; aegarane-augue, / 20 %	<ul> <li>Plagioclase, rare</li> </ul>	• Zeolite-natrolite	• Biotite, small and rare, flaky	• Titanite , ÷ 3%	◇PHENOCRYSTS	• Alkali feldspare (perthite), $= 55\%$ , $2 \sim 30$ mm,	prismatic	<ul> <li>Nepheline</li></ul>	<ul> <li>Clinopyroxene (aegirine),</li></ul>	prismatic ~ granular ~ irregular, some with	aegirine-augite core	• Titanite, rare, < 0.6 mm, wedge-shaped	• Sodalite, = 1%; interstitial	
,	Macroscopical features and microscopical texture and structure	Grayish olive green	Compact and hard	• Fine-grained	• Holocrystalline												• Light gray ~ grayish brown	• Mosaic	• Compact	• Coarse-grained						**************************************
	Rock Name	NEPHELINITE															NEPHELINE	SYENITE							:	
o d	Number	KR-030					. '			į							KR-031				٠					

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (8)

minerals minerals minerals minerals minerals minerals minerals minerals and theore component acanage and safety of \$0.2 \times 5 mm, including agetime (Nagnetite, ereddish Compect and hard (Compect and hard (Nagnetitied)) = \$3.5%, 10 mm, scarce, amorphous including agetime and sporadically (No. 2 mm, long prismatic ~ exicular ~ granular (No. 2 mm, long prismatic ~ exicular ~ granular (Nagnetitial) (Nagnet
ine • Magnetite, small, scarce, < 0.5 mm • Limonite cks prismatic or granular granular mm, • Magnetite, ÷ 2%, < 0.5 mm
scarce, < 0.5 mm • Limonite  • Hematite, scarce, prismatic or granular  mm, • Magnetite, ÷ 2%, < 0.5 mm
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wroyone (secritics) = 10% / 9 mm
Promotic (activity), 10 %, 7 mills,
prismatic~ granular

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (9)

				Unidentified Minerals	Hinerals	
Sample Number	Rock Name	Macroscopical features and microscopical texture and structure	Identified minerals	Opaque minerals	Transparent minerals	Remarks
(KR-34)			<ul> <li>Hornblende, rare, &lt; 3 mm, long prismatic, some parallel grown with aegirine</li> <li>Titanite , = 1%, &lt; 1 mm, wedge-shaped</li> <li>Biotite , rare, &lt; 1 mm, flaky</li> <li>Apatite , rare, &lt; 0.5 mm, long prismatic</li> <li>Sodalite , scarce, interstitial</li> </ul>			
KR-039	ASH-FLOW TUFF	<ul> <li>Dark reddish brown fragments in yellowish gray matrix (flow structure), loose reddish brown fragments</li> <li>Amorphous, brownish red and black material</li> </ul>			• Yellowish gray matrix, originally, grass	"agglomerate"     Partial facies of     alkaline igneous     rocks
KR-101	SANDSTONE	<ul> <li>Pale yellowish brown</li> <li>Hard</li> <li>Vesicle-rich</li> <li>Fine-grained</li> <li>Granular</li> </ul>	• Quartz, = 85%, 0.02 ~ 0.4 mm, granular • Barite, scarce, <0.02 m, irregular	• Limonite, ÷ 15% granular, forming, pseudomorph after mafic mineral(s), < 0.5 mm		
KR-102A	BARITE ROCK	White and pale brown     Heavy	<ul> <li>Barite, = 99%, prismatic (up to 30 mm) ~ granular</li> <li>Quartz, = 1%, granular, 1 ~ 15 mm</li> </ul>			
KR-102B (1)	(1) CARBONATITE	• Granular	<ul> <li>Carbonate (calcite), &gt; 99 %, irregular ~ granular (rounded), mainly 0.4 ~ 1 mm</li> <li>Plagioclase, &lt; 1 %, &lt; 0.03 mm, granular</li> </ul>	• Magnetite		

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (10)

				Unidentifie	Unidentified Minerals	
Number	Rock Name	macroscopical reatures and microscopical texture and structure	Identified minerals	Opaque	Transparent	Remarks
KR-102B	CALCITE	• Granular	• Carbonate (calcite), ⇒ 90 %, 0.1 ~ 2 mm, granular	• Limonite,		
ଷ	CARBONATITE	• Vein	• Alkali feldspar, interstitial	< 10%, fine-		
			• Nepheline, prismatic	grained,		
				granular,		
				forming		
				pseudomorphs		
				after		
				magnetite		
				(0.05 ~ 2 mm)		
KR-104	CAMPTONITE	Olive gray.	♦PHENOCRYSTS	• Magnetite,		
		Compact and hard	• Hornblende, < 1%, 1 ~ 2.5 mm, prismatic,	< 2%,		
		• Seriate	inclusions: magnetite, apatite and	< 0.3 mm,		
			clinopyroxene	enhe ~		
				2		
			• Clinopyroxene (11-augite), $= 3\%$ , 0.5 $\sim 2$ mm,	irregular		
			prismatic, inclusions: magnetite and apatite		1	:
			• Titanite, < 1%, 0.5 ~ 2 mm, wedge-shaped,			
			inclusions: magnetite, clinopyroxene and			
Tol 4 1.1	:		clorite			
			• Apatite , < 1 mm, long prismatic			
			Olivine, altered to chlorite and serpentine			
			2-			
			♦ GROUNDMASS (> 95%)			
			• Clinopyroxene ]	1		
			◆ Hornblende } , Frismatic, U.1 ~ U.2 mm			
		:	• Plagioclase, polkilitic, intersertal			
			• Nepheline			The second of th
*** *** ***			Alkali feldspar			
			• Smectite			
			• Calcite			. 74
						The second secon

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (11)

				Unidentified Minerals	d Winerals	
Sample		Macroscopical features and		200000000000000000000000000000000000000	The state of the s	
Number	Rock Name	microscopical texture and structure	Identified minerals	Opaque	Transparent	Remarks
				minerals	minerals	
KR-106	CAMPTONITE	Dark gray	♦ PHENOCRYSTS	• Magnetite		
	-	• Compact and hard	• Olivine, = 7%, 0.2 ~ 1.5 mm, granular ~ prismatic	, \ 1%		
		• Fine-grained	• Clinopyroxens (augite), < 1 %, 0.3 ~ 1 mm, short	(phenocryst)		
		Porphyritic, fluidal	prismatic ~ tabular	,≐3%		
:				(groundmass)		
			♦GROUNDMASS(> 90%)			
			• Clinopyroxene, = 70%, 0.1 mm, prismatic		٠	Alligher og
			• Olivine ,2%, < 0.05 mm, granular		-	echano <sup>a</sup> C
			• Plagioclase, 15% < 0.1 mm, prismatic			
			• Nepheline , < 1%, intersertal			
KR-109	LAPILLI TUFF	Lithic fragments such as	• Calcedny , = 30%, radial aggregate	• Limonite,		• "agglomerate"
		sandstone and limonite mass	• Alkali feldspar, = 30 %, irregular	= 35 %		}
	سميين		• Barite , = 3 %, aggregate	irregular		<ul> <li>Partial facies of</li> </ul>
						alkaline igneous
						rocks
SH-34	MONCHI	Olive grav with white and black	STSV970N9H9<	• Marmorita		
	CITTUE					
-	4011	Sports	Onvalle, - 5 %, 1 min, compacery repraced by	rare,		
		• Compact and hard	aggregate of calcite, magnetite, agate, white	0.1 mm		
		Porphyritic	mica and serpentine	• Hematite		
		• Vein (calcite)	• Clinopyroxene (augite), = 2%, 2 mm, prismatic			
	· · · · · · · · · · · · · · · ·		• Biotite, = 3%,0.5~1 mm, flaky, forming ophitic	: :		
			plates with clinopyroxene and calcite prisms			
					-	
			♦GROUNDMASS(>90%)	:		
			• Carbonate (calcite) > 30%			
			Clinopyroxene			A second of the
			4			
			- Angled		2	
		and a resolution of the order of the same and resolution of the same of the sa	The CALLOCATE Control of the Callocate Calloca		-	
			• Glass devitritied to smectite and chlorite			

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (12)

			A CONTRACT OF THE PROPERTY OF	Unidentified Minerals	d Minerals	
Sample	Bock Name	Macroscopical features and	Identified minerals		E	Romarks
Number	TOOK INGILIE	microscopical texture and structure	The state of the s	Opaque minerals	Transparent minerals	Nemarks
SH-35	SPESSARTITE	<ul> <li>Olive gray</li> <li>Compact and hard</li> <li>Aphyric</li> </ul>	<ul> <li>◇PHENOCRYSTS</li> <li>Olinopyroxene; augite, rare, long~short prismatic</li> <li>◇GROUNDMASS (&gt; 99%)</li> <li>Brown hornblende, = 30 %, prismatic</li> <li>Olinopyroxene (augite), = 30 %</li> <li>Glass ,= 30 %, interstitial</li> <li>Plagioclase, &lt; 1 %</li> </ul>	• Magnetite , = 8 %, granular		
SH-36	HORNBLENDE ANDESITE	<ul> <li>Light olive gray with white prismatic crystals</li> <li>Porphyritic, pilotaxitic</li> </ul>	<ul> <li>◆PHENOCRYSTS</li> <li>◆ Plagioclase, = 10%, 0.5 ~ 5 mm, prismatic, replaced by sericite along rim and cracks</li> <li>◆ Hornblende, = 5%, 0.2 ~ 4 mm, long~stout prismatic, replaced by smectite and limonite</li> <li>◆ Clinopyroxene, = 2%, short prismatic, completely replaced by opaque granules, smectite, chlorite and limonite</li> <li>◆ Olivine , rare, &lt; 1 mm, replaced by smectite, calcite, limonite and chalcedony</li> <li>◆ GROUNDMASS (&gt; 80%)</li> <li>◆ Plagioclase, = 40%</li> <li>◆ Carbonate (calcite), = 30%</li> <li>◆ Apatite</li> </ul>	• Magnetite • Hematite, granules		
SH-39	HORNBLENDE ANDESITE	<ul> <li>Gray</li> <li>Compact and hard</li> <li>Porphyritic, fluidal</li> </ul>	$\diamond$ PHENOCRYSTS $\bullet$ Plagioclase, $\mp$ 7%, 0.5 $\sim$ 5 mm, prismatic, some with dusty inclusion-rich core, altered to sericite partially	• Magnetite ,= 1% ,<0.5 mm, granular		

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (13)

				Unidentified Minerals	d Minerals	
Sample Number	Rock Name	Macroscopical teatures and microscopical texture and structure	Identified minerals	Opaque minerals	Transparent minerals	Remarks
(SH-39)			<ul> <li>Hornblende</li> <li>Clinopyroxene ∫</li> <li>≠ 5%, 0.5 ~ 4 mm, long prismatic ~ granular, altered to calcite, chlorite or smectite, opaque</li> <li>Titanite, rare, &lt; 0.5 mm, wedge-shaped</li> </ul>			
			<ul> <li>◇GROUNDMASS(&gt; 85%)</li> <li>• Carbonate (calcite), = 40 %</li> <li>• Plagioclase, = 40 %</li> <li>• White mica</li> <li>• Apatite</li> </ul>			amerina eta al-Maria (Maria Prima eta errologo Arr
MR-106	CALCITE. CARBONATITE	Grayish brown and white	<ul> <li>⑤ Brown portion:</li> <li>Carbonate (calcite), ⇒ 80 %, fine grains without definite outline</li> </ul>	• Limonite, = 20 %, irregular		
			<ul> <li>w muse portuon:</li> <li>Carbonate (calcite), &gt; 98%, 0.2 ~ 10 mm</li> <li>Apatité, &lt; 1 %, &lt; 0.1 mm, granular</li> </ul>	• Magnetre, rare, irregular • Limonite,	:	ar y y y y y y y y y y y y y y y y y y y
MR-108	SYENITE	<ul> <li>Dark greenish gray</li> <li>Compact and hard</li> </ul>	Alkali feldspar, # 83%, 0.2 ~ 0.5 mm, prisimatic ~ granular, dusty, Apatite and magnetite inclusions.  Hornblende ,rare, < 1 mm, prismatic ~ granular, pleochroism; grass green ~ pale	• Magnetite, = 15%, intersertal, prismatic		ann ann an Airinn ann an A
			greenish yellow.  • Replacement by limonite is noted along rim and cracks.  • Carbonate interstitial, prismatic.  • Apatite  granular			

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (14)

7.				Unidentified Minerals	ed Minerals	
Sample	Rock Name	Macroscopical features and	Identified minerals	Opaque	Transparent	Remarks
Taguinger		microscopical texture and structure		minerals	minerals	
(MR-108)			• Plagioclase , rare, < 1.5 mm, prismatic			
			Tare, < 4 mm			
MR-111	NEPHELINE	Dark gray	Nepheline , ⇒ 80%, 0.2 ~ 5 mm, tabular	• Magnetite		·
	SYENITE	<ul> <li>Compact and hard</li> </ul>	, inclusions (clinopyroxene	, < 1%		
		• Granular	, hornblende and titanite altered white	, < 0.5 mm		
			mica along rim and cracks)	, irregular		
			• Alkali feldspar, < 5%, interstitial		-	
			一年一年一年一年一年一年一年			
			<ul> <li>Hornblend , = 15%,0.05 ~ 2 mm</li> </ul>			PS4-jac-v
	-		, prismatic ~ granular, pleochroism	-:		(c <del>hylus franci</del> )
	-		; light ~ pale green or yellowish gray			es e e e e e e e e e e e e e e e e e e
			(aegirine - aujite ~ aegirine)	3.		
			• Clinopyroxene; = 2%, 1 mm, plecchroism			
			; pale green (core) or graynish green	•		
			• Sodalite , < 2%, interstitial			-
			• Titanite , = 1%, < 1 mm			· resignation
			• Biotite , < 1%, < 0.5 mm			roins po
,			• Apatite , < 1%, prismatic~granular			ig <b>ma</b> co
			, pleochroism			
			; brown ~ pale green			
MR-112	NEPHELINE	<ul> <li>Light gray with moderate brown</li> </ul>	• Plagioclase, = 30%, < 10 mm, prismatic	• Magnetite		
	SYENITE	spots	, altered to carbonate partially	,<1%		
		- Coarse - grained mosaic	• Alkali feldspar, = 40%, < 10 mm, parthite	, < 0.5 mm,	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
			<ul> <li>Hornblende,</li></ul>	irregular		
			prismatic~granular, pleochroism;			
			green~pale green			
			• Sodalite , < 1%, < 2 mm, interstitial			
			• Titanite , < 1%, < 2 mm, wedge-shaped			
			Clino pyroxene (aegirine), pleochroism; light green			
			(core) or dark green (rim) ~ yellowish green			**************************************
	***************************************		A CONTRACTOR OF THE PROPERTY O			0

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (15)

	Remarks		• "agglomerate" • Partial facies of alkaline igneous rocks	maken kalifar di Makik kapin di minan kanan k	
Unidentified Minerals	Transparent minerals				
Unidentifie	Opaque minerals	- - - - - - - -	• Magnetite , < 1% Limonite , ÷ 10%	Magnetite , < 1% , irregular, < 0.5 mm	
	Identified minerals	• Biotite , < 1%, < 0.2 mm, pleochloism; dark~ pale brown	• Apatite, = 5%, prismatic • Augite, = 1%, fragmental • Alkali feldspar (cryptoperthite - microcline), = 2%, granular, fragmental • Plagioclase, = 1%, granular, fragmental • White mica, rare, < 0.5 mm  Matrix ,= 70%  Carbonate ,= 50%  White mica, rare	ORYSI	<ul> <li>Titanite , &lt; 1 %, &lt; 0.5 mm, wedge-shaped</li> <li>GROUNDMASS (=70%)</li> <li>Plagioclase</li> <li>Nepheline ~ Cancrinite , = 50%</li> <li>Clinopyroxene, Hornblende , &lt; 5 %</li> </ul>
Macrosconical features and	microscopical texture and structure		<ul> <li>Light brownish gray with dark gray, moderate brown, white and very pale orange fragments</li> <li>Lithic fragments, = 10% (Sandstone ~ Mudstone, Limestone)</li> </ul>	<ul> <li>Dark greenish gray</li> <li>Compact and hard</li> <li>Porphyritic</li> </ul>	
	Rock Name		LAPILLI TUFF	PHONOLITE	
Somela	Number	(MR-112)	MR-113	MR-114	

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (16)

	ent Remarks s			
d Minerals	Transparent minerals			
Unidentified Minerals	Opaque minerals		Magnetite , < 1 % , irregular, < 0.5 mm	Magnetite , < 1 % Hematite , < 1 %
	Identified minerals	• Apatite :	<ul> <li>Népheline , = 75%, &lt; 10 mm, short prismatic</li> <li>Alkali feldspar, &lt; 10%, &lt; 10 mm, prismatic</li> <li>Cancrinite , &lt; 3%, interstitual</li> <li>Clinopyroxene , &lt; 5%, &lt; 2 mm, prismatic</li> <li>Hornblende , = 2%, &lt; 2 mm, pleochroism</li> <li>Sodalite , &lt; 1%, interstitial</li> <li>Titanite , &lt; 1%, &lt; 1 mm, wedge shaped</li> <li>Biotite , pleochroism ; dark ~ pale brown</li> <li>Apatite</li> </ul>	<ul> <li>◇PHENOCRYSTS</li> <li>• Clinopyroxene, = 10%, &lt; 3 mm, long ~ short prismatic, aegirine rim replaced with carbonate, partially along rim and cracks</li> <li>• Plagioclase , = 10%, &lt; 2 mm, tabular, completely replaced by carbonate and white mica.</li> <li>• Hornblende , &lt; 1%, &lt; 1 mm, long prismatic , pleochroism; greenish ~ pale brown</li> <li>• Apatite , &lt; 1%, &lt; 0.5 mm, Prismatic</li> <li>&gt; Garbonate , = 15%</li> <li>• White mica , = 15%</li> <li>• White mica , = 15%</li> <li>• Clinopyroxene</li> <li>• Elotite</li> </ul>
L	Macroscopical texture and structure		<ul> <li>Greenish black and greenish orange (pink)</li> <li>Compact and hard</li> <li>Medium ~ coarse-grained</li> <li>Granular</li> </ul>	<ul> <li>Dark greenish gray</li> <li>Compact</li> <li>With black crystals</li> <li>Porphyritic</li> </ul>
	Rock Name		SYENITE	Carbonatized)
	Number	(MR-114)	MR-117	MK-0.1

Microscopic Observation of Rocks in Thin Section (Igneous Rocks) (17)

ξ. 2 2	Kernarks		
Unidentified Minerals	Transparent minerals		
Unidentifie	Opaque minerals		• Magnetite , < 1 %, < 0.8 mm , granular or irregular • Magnetite , < 3 % , granular , q.3 % , altered to limonite
Tantifical minosola	identilled minerals	<ul> <li>Nepheline , bokilitic, &lt; 20 %</li> <li>Titanite</li> </ul>	<ul> <li>◇PHENOCRYSTS</li> <li>• Clinopyroxene, = 3%, &lt; 2 mm, long ~ short prismatic</li> <li>• Clinopyroxene, = 10%, &lt; 1 mm, long prismatic</li> <li>• Hornblende, = 10%, &lt; 1 mm, long prismatic</li> <li>• Hornblende, = 10%, long prismatic</li> <li>• Plagioclase, &lt; 2%</li> <li>• Apatite, &lt; 1%</li> <li>• Montronite</li> <li>• Clinopyroxene, = 10%, long prismatic</li> <li>• Carbonate, = 1%</li> <li>• Clinopyroxene, = 7%, &lt; 5 mm, short prismatic</li> <li>• Olivine, = 3%, &lt; 2 mm, completely replaced, short prismatic</li> <li>• Olivine, = 50%, &lt; 0.5 mm, prismatic</li> <li>• Clinopyroxene, = 10%, irregular</li> <li>• Carbonate, = 2%</li> <li>• Clinopyroxene, = 2%</li> <li>• Clino</li></ul>
Macroscopical features and	microscopical texture and structure		Olivine gray Compact and Hard Fine-grained Porphyritic Hyalopilitic  Dark gray Compact and hard Fine-grained Porphylitic Hyalopilitic Hyalopilitic
Dool Money	rock Name		CAMPTONITE  MONCHI- QUITE
Sample	Number	(MK-01)	MK-26

# Photomicrographs of Rocks in Thin Section (Igneous Rocks)

### Abbreviations

# Minerals

Qtz : quartz : potassium feldspar

: plagioclase Bi : biotite

Hor: hornblende Cpx: clinopyroxene

Ne : nepheline Ol : olivine

Cn : cancrinite Sd: sodalite

Ap : apatite Ti. : titanite

Gar : garnet Tor : tourmaline

Zir : zircon Ru: rutile

Chl: chlorite Serp: serpentine

Mus: muscovites Ca : calcite

Cr : cristobalite Se : sericite

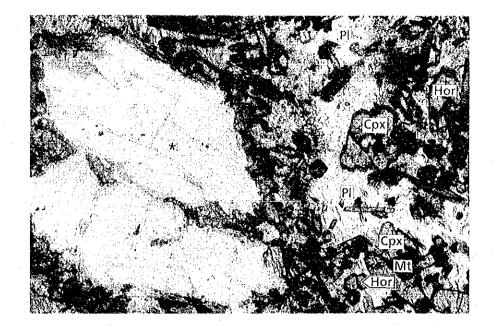
Non: nontronite Sm : smectite

Anl: analcime Lim: limonite

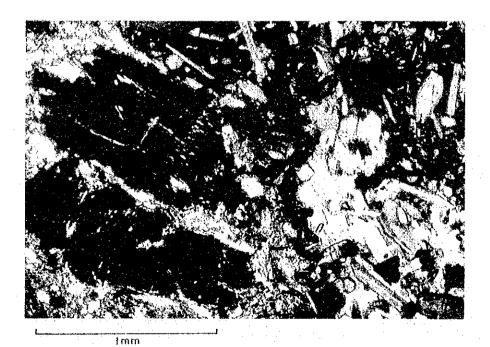
## Others

Mt : magnetite

Cly : clay Opq: opaque minerals



one polar

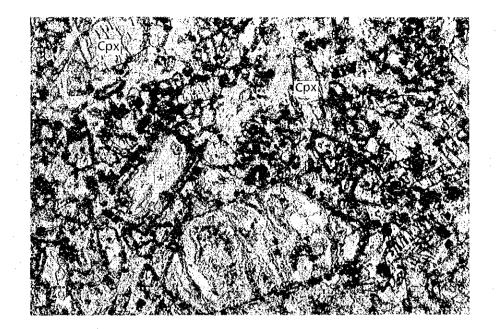


crossed polars

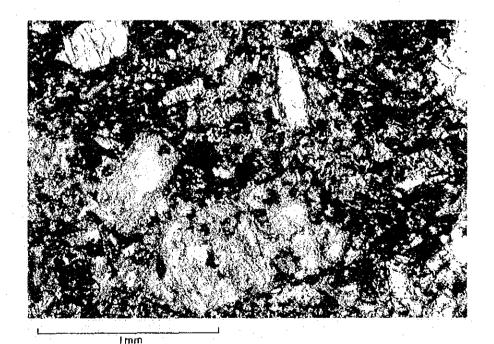
\* Serp+Chl (Pseudomorph after Ol) Sample No.: KR-104

Location: Mwangulu

Rock name: Camptonite



one polar

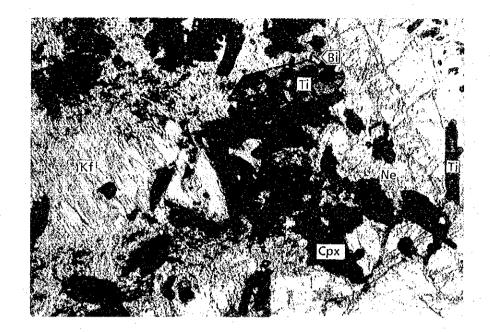


crossed polars

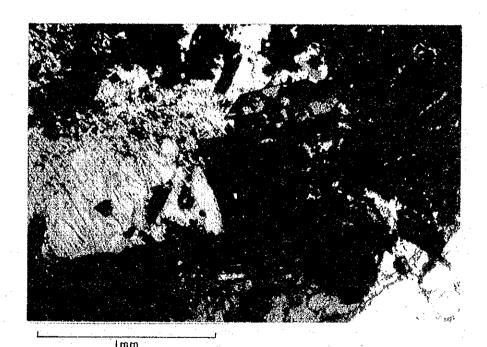
\* Ca (Pseudomorph after Ol) Sample No.: MW-03

Location : Northwest of Mwena

Rock name: Monchiquite



one polar

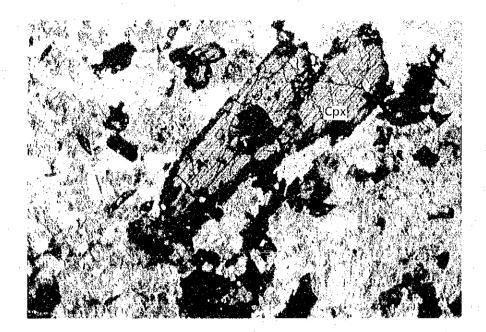


crossed polars

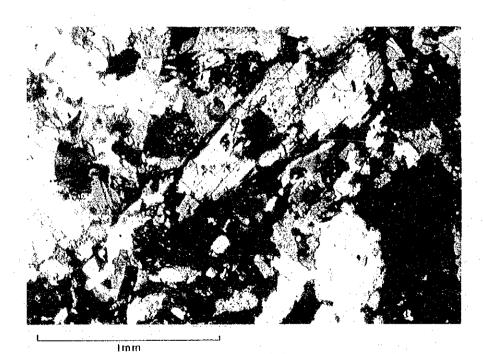
Sample No.: KR-032 Location : Jombo Hill

Rock name: Nepheline Syenite

Photomicrographs (thin section)

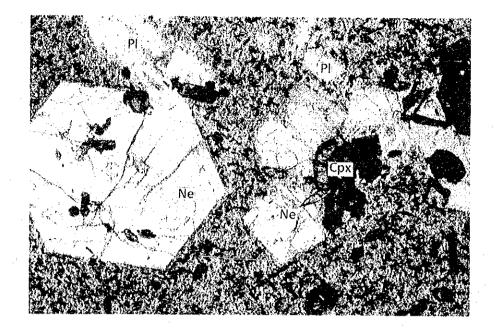


one polar

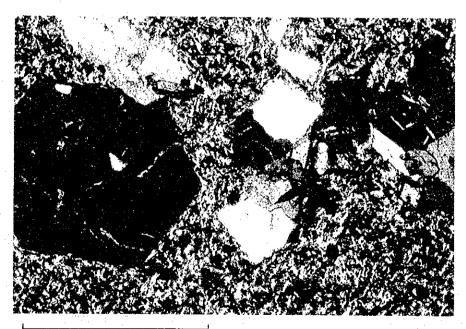


crossed polars

Sample No.: KR-020C Location : Dzirihini Rock name : Syenite



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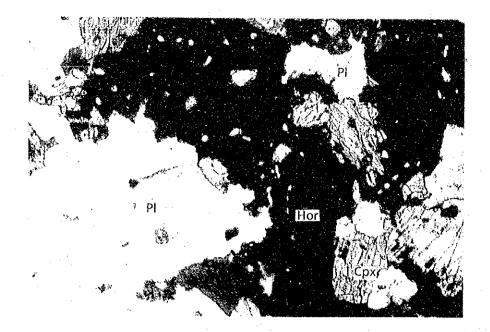
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|mm

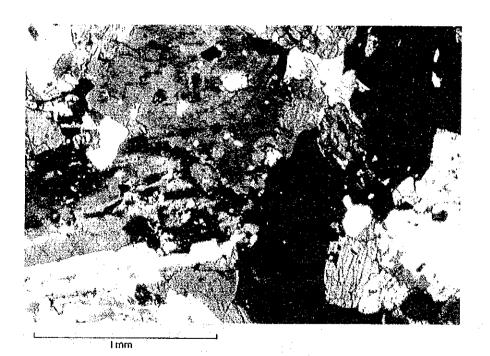
Sample No.: MR-114

Location : Henzamwenye

Rock name : Phonolite



one polar



 ${\bf crossed\ polars}$ 

Sample No.: KR-025A

Location : South of Jombo Hill

Rock name : Gabbro



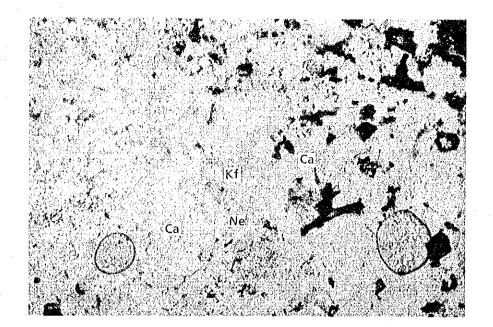
one polar



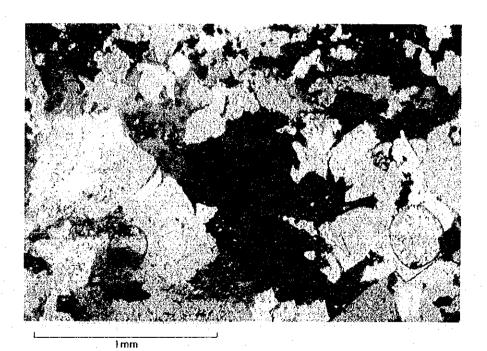
crossed polars

Sample No.: KR-025B

Location : South of Jombo Hill Rock name : Nepheline Syenite



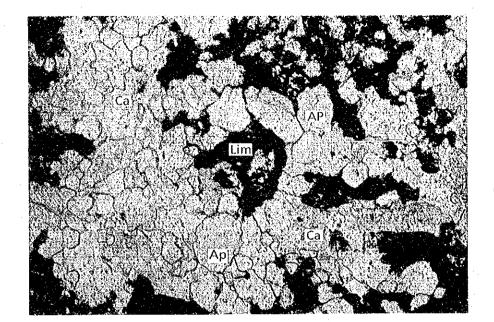
one polar



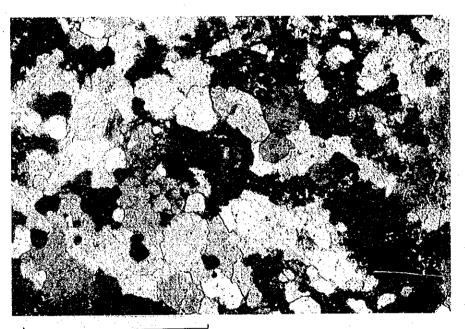
crossed polars

Sample No.: KR-102 (B) Location : Mrima Hill

Rock name: Calcite Carbonatite



one polar



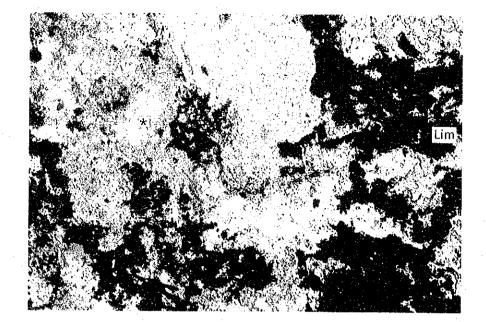
crossed polars

Imm

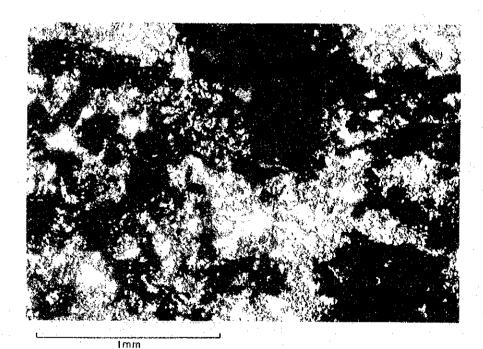
Sample No.: MR-106

Location : Mrima Hill

Rock name: Carbonatite



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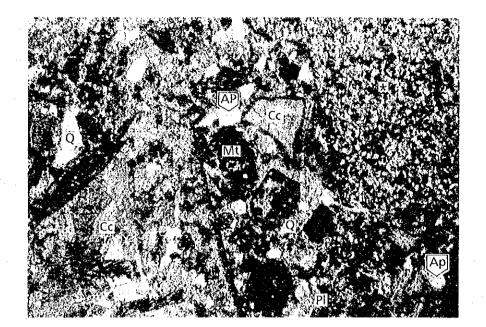
crossed polars

\* chalcedony

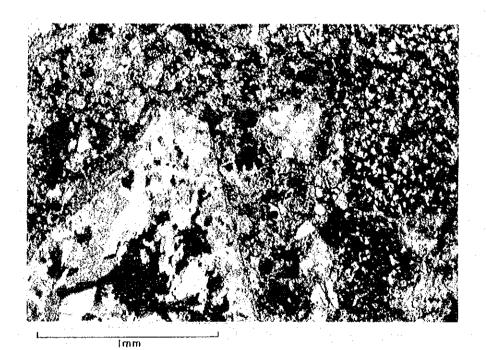
Sample No.: KR-109

Location : Kiruku Hill Rock name : Lapilli Tuff

("agglomerate")



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crossed polars

\* lithic fragment (sandstone)

Sample No.: MR-113

Location : Mwananyamala

Rock name: Lapilli Tuff

Summary of Microscopic Observation (Sedimentary Rocks)

Microscopic Observation of Rocks in Thin Section (Sedimentary Rocks) (1)

	Source (or remakrs)	Granitic rocks and/or gneiss Formation: Taru (middle)	Granitic rocks and/or gneiss Formation: Taru (upper)
Unidentified	Minerals and Material	Clay material	• Clay material
s and Material	Matrix	• (< 5 %, very little) • Calcite	• Clay material • Sericite or illite • Chlorite
Identified Minerals and Material	Detrital Material	• Quartz, = 85%, < 3mm, subangular to angular, mostly monocrystalline (igneous origin)  • Alkali feldspar, = 35 %, < 2 mm, altered to calcite and sericite  • Plagioclase, = 25 %, < 1.5 mm, subangular to angular, altered to sericite  • Chlorite • Chlorite	• Calcite • Biotite • Garnet (= 50%) • Quartz, = 38 %, < 0.2 mm, subround ~ subangular • Plagioclase, = 10 %, smaller than Quartz, subangular • Alkali feldspar, < 5 %, smaller than Quartz • Muscovite, < 2 %
	Microscopic Features	• Moderately - sorted	Roughly parallel alignment of musicovite flakes, indicating bedding or lamination     Well-sorted     Much matrix and mineralogically immature.
	Macroscopic Features	• Light gray • Compact • Transparent grains (dominant) and milky white grains. • No lamination and grading texture • including mudstone clasts.	Uight grayish brown Massive: No lamination and grading Compact
	Sample Name	SANDSTONE	SILTSTONE
	Code No.	KR-014	SH-28

Microscopic Observation of Rocks in Thin Section (Sedimentary Rocks) (2)

Source	(or remarks)	Formation: Maji ye Chumvi (lower)	• Granitic and/or gneissose rocks Formation: Maji ya Chumvi (lower)
Unidentified	Material	•Clay material	• Clay material • Opaque minerals
and Material	Matrix		Sericite, chlorite other clay minerals.
Identified Minerals and Material	Detrital Material	• Calcite, > 95%, (calcite vein) (i) peloid-like grains lacking interal structure and composed of micrite (ii) very fine-grained micrite. (iii) secondarily precipitated sparry calcite subangular ~ angular, monocrystalline	• Quartz, = 50%,
Milatononio Dontinon	MACCOSCOPIC Features	Consisting mainly of micrite.  Recrystallized peloids  Porous parts filled with sparry calcite	• Well-sorted
Monday of Monday	macioscopic r eatures	• Gray ~dark gray • Massive • Compactnot porous	• Light brown • Compact and Massive • With obscure lamination
Sample Mone	Sample Manie	LIMESTONE	SANDSTONE
N. S.	7000 T 70.	60-09	KR-013

Microscopic Observation of Rocks in Thin Section (Sedimentary Rocks) (3)

N. O. K.	<b> </b>			Identified Minerals and Material	and Material	Unidentified	Source
Code No.	Sample Mame	Macroscopic regiures	Milcroscopic reatures	Detrital Material	Matrix	Material	(or remarks)
KR-011	SANDSTONE		<ul> <li>Moderately sorted</li> </ul>	(80 ~ 85 %)	• Chlorite	• Clay material	Formation:
			• Roughly parallel	• Quartz, > 50%,	<ul> <li>Clay minerals</li> </ul>	Opaque minerals	Maji ya Chumvi
			alignment of	< 0.15 mm, angular ~			(midale)
-			muscovite and	subangular			
·			biotite, flakes,	<ul> <li>Plagioclase,</li></ul>			
		:	indicating bedding.	< 0.15 mm, angular ~			
				subangular			
				• Alkali feldspar, ≑ 15 %,			
·				< 0.15 mm, angular ~			
				subangular, altered to			
				sericite	-		
				Chlorite, ≥5%			-
,				• Bioteite, ≥ 5%			
				• Muscovite, a few %			
				• Tourmaline, a few %			
				• Zircon, a few %			
SH-32	SILTSTONE	• Yellowish brown	• Well-sorted	• Quartz, = 30 %,	(35~40%)	• Clay material	Formation:
		Compact and	◆ Mineralogically	< 0.2 mm, subangular,	• Clay mineral	Opaque minerals	Maji ya Chumvi
4		massive	immature	indicating metamorphic	Opaque mineral		(middle)
<b></b>		• No lamination		origin.		:	
-				• Plagioclase, = 20%,			• Fossil bed
			•	smaller than Quartz			
			1.	• Alkali feldspar, = 10%,			
-				small, subangular, cloudy	-		
				due to alteration, altered to			
				sericite			
				• Muscovite, a few %			
:				• Chlorite			
		the second second section of the second section of the second section section section sections and the second	the second secon	• Zircon			
				***************************************		Å-ramona and a second	

Microscopic Observation of Rocks in Thin Section (Sedimentary Rocks) (4)

	Source	(or remarks)	Formation:	(upper)		70.55									Formation:	Maji ya Chumvi	(upper)		-			Carte								<u> </u>
	Unidentified	Material	• Clay material	ב כ המלחב ווווובו מוז		· •••									•Clay material		*··				,									
	and Material	Matrix	• Clay								44				(≤15%)	• Calcite	• Clay minerals (chlorite)											-	1-	
	Identified Minerals and Material	Detrital Material	(≠80%) • Onant = 45%	< 0.15 mm, subangular ~	angular	• Plagioclase, = 25 %,	subangular ~ angular	<ul> <li>Alkali feldspar,</li></ul>	altered to sericite	• Chlorite, <a %<="" few="" td=""><td>• Muscovite</td><td>• Tourmaline</td><td>• Zircon</td><td>• Opaque minerals</td><td>(≠85%)</td><td>• Quartz, = 30 %, &lt; 0.025</td><td>mm,</td><td>subangular ~ angular</td><td><ul> <li>Plagioclase,</li></ul></td><td>&lt; 0.025 mm, subangular ~</td><td>angular</td><td>• Alkali feldspar, = 25%,</td><td>&lt; 0.025 mm, subangular ~</td><td>angular</td><td>• Chlorite (origin biotite)</td><td>• Muscovite</td><td>• Zircon</td><td>• Sphene</td><td>• Tourmaline</td><td></td></a>	• Muscovite	• Tourmaline	• Zircon	• Opaque minerals	(≠85%)	• Quartz, = 30 %, < 0.025	mm,	subangular ~ angular	<ul> <li>Plagioclase,</li></ul>	< 0.025 mm, subangular ~	angular	• Alkali feldspar, = 25%,	< 0.025 mm, subangular ~	angular	• Chlorite (origin biotite)	• Muscovite	• Zircon	• Sphene	• Tourmaline	
. :	Mineracon Doctors	wicloscopic readles	• Well-sorted	contacts (sometimes),	because of pressure-	solution during	diagenesis.			-					Moderately - Sorted	<ul><li>Originally "clean"</li></ul>	sandstone, lacking	clay matrix	<ul> <li>Irregular and wavy</li> </ul>	grain contacts,	because of pressure-	sollution during	diagenesis				Account to the second s			
	Manney Dont 1 mon	Madioscopic i eatales	• Light brownish gray	• Compact								-			<ul> <li>Light gray ~ white</li> </ul>	Obscure lamination	• Arkosic													***************************************
	Somalo Namo	Dampie Haine	SILTSTONE											- <del></del> -	SANDSTONE						-									
	, N	Oore 140.	SH-23						-						KR-010															

Microscopic Observation of Rocks in Thin Section (Sedimentary Rocks) (5)

Source (or remarks)	Formation: Mariakani (lower)	Formation: Mariakani (Iower)
Unidentified Minerals and Material	• Clay material	
and Material Matrix	• Caloite (Clay)	• Chlorite • Clay material
Identified Minerals and Material Detrital Material Ma	(≥90%)  •Quartz, =35%, <0.25 mm, subangular ~ subrounded  •Plagioclase, =30%, <0.25 mm, subangular ~ subrounded  •Alkali feldspar, =25%, <0.25 mm, subangular ~ subrounded  •Alkali feldspar, =25%, <0.25 mm, subangular ~ subrounded, frequently altered  •Chiorite (origin biotite), 5%   • Muscovite  • Garnet  • Allanite	(80 ~ 85 %)  • Quartz, \$\Rightarrow\$ 30 %, < 0.2 mm, subrounded ~ subangular subangular  • Plagioclase, \$\Rightarrow\$ 20 %, subangular  • Alkali feldspar, \$\Rightarrow\$ 20 %, subrounded, altered to sericite  • Biotite and Chlorite, \$\Rightarrow\$ 15 %
Microscopic Features	• Moderately - sorted • Irregular grain contacts because of pressure - solution during diagenesis	Poorly or moderately     Sorted     Parallel alignment of biotite flakes     (indicating bedding and/or lamination)
Macroscopic Features	• Light gray • Milky white patches • Massive and compact • No lamination	• Gray • Lamination due to mica flakes • Compact
Sample Name	SANDSTONE	MICACEOUS
Code No.	KR-007	KR-006

Microscopic Observation of Rocks in Thin Section (Sedimentary Rocks) (6)

Source	(or remarks)	Formation: Mariakani	(middle)														Formation:	Mariakani	(middle)										
Unidentified	Material	Clay material							~~~								• Clay material	•Opaque minerals							:			2.4	
s and Material	Matrix	(≥ 50%) • Caloite	(• Chlorite)	Clay						: : : : : : : : : : : : : : : : : : : :							• Calcite	( Chlorite)	(• Clay)	• Opaque									
Identified Minerals and Material	Detrital Material	•Quartz, = 25 %, < 0.2 mm, subrounded ~ subangular	<ul> <li>Plagioclase,</li></ul>	$<$ 0.2 mm, subrounded $\sim$	subangular	<ul> <li>Alkali feldspar, = 10%,</li> </ul>	$< 0.2$ mm, subrounded $\sim$	subangular, altered to	sericite.	• Muscovite	• Chlorite	• Zircon	Sphene	• Tourmaline	•Garnet	(* Biotite)	(80 ~ 85%)	• Quartz, = 35 %, < 0.25 mm,	subangular	<ul> <li>Alkali feldspar,</li></ul>	< 0.2 mm, subangular,	altered to sericite	• Plagioclase, = 20%,	< 0.2 mm, subangular	<ul> <li>Chlorite (origin biotite),</li> </ul>	-2%	• Muscovite	• Zircon	• Garnet
M. Constitution of the con	microscopic reacutes	• Moderately - sorted clastic grains	abundant,														· Moderately - sorted	• Parallel alignment of	biotite flakes,	indicating bedding or	lamination.								
M. Constant	macroscopic readures	<ul><li>Light gray</li><li>Massive</li></ul>	• Obscure lamination	· Compact and hard	and the property of the proper												• Light yellowish	brown	• Massive	• Compact, not so hard									
Somnie Nome	Sample Dame	CALCAREOUS SANDSTONE	(SILTSTONE)			-	<del></del>										SANDSTONE									Section of Contract of the Con			
7 600	000	SH-05									7			:			SH-04												and the second second

Microscopic Observation of Rocks in Thin Section (Sedimentary Rocks) (7)

No.	Somple Mame	Something of the second	Missississis I consideration	Identified Minerals and Material	and Material	Unidentified	Source
2000	Sampremanne	Macroscopic r eacures	Michologopic F eachtes	Detrital Material	Matrix	Minerals and Material	(or remarks)
KR-005	CALCAREOUS		<ul> <li>Moderately ~ well-</li> </ul>	(≑ 50 %)	( ≑ 20 %)	• Clay material	Formation:
	SANDSTONE	•	sorted	• Quartz, = 25%,	• Calcite		Mariakani (upper)
			• Roughly parallel	< 0.25 mm, subangular	• Clay		
	-		alignment of biotite	• Plagioclase; = 15 %,			
			flakes	< 0.25 mm, subangular			
				• Alkali feldspar, = 10%,			
				altered to calcite or sericite	-		
		-		• Chlorite (origin biotite)			
				• Garnet		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	:
				• Apatite			
				• Zircon			
		÷		• Sphene			
SH-13	SANDSTONE	• Light gray	Originally porcus	(≑85%)	• Opaque materials	◆ Opaque minerals	Formation:
	:	• Hard, but porous	quartzose sandstone	• Quartz, 40 %, = 0.5 mm,	• Chlorite	• Clay material	Mazeras (upper)
			with rounded quartz	rounded ~ subrounded	<ul> <li>Secondary precipitated</li> </ul>		
			grains	<ul> <li>Plagioclase, 25 %,</li></ul>	quartz		
			• Well - cemented by	subrounded	(• Clay)		
			secondally quartz	• Alkali feldspar, ≑ 15%			
				• Garnet			
		-		• Zircon			

Microscopic Observation of Rocks in Thin Section (Sedimentary Rocks) (8)

Source	(or remarks)	Formation:	Mazeras (middle)									Formation:	Mazeras (upper)										Formation:	Kambe			:	
Unidentified Minerals and	Material	• Opaque minerals	· Clay material		_,							• Clay material				-				n <del>o e</del> n trademand			• Calcite					
s and Material	Matrix	• Calcite	• Opaque mineral	( Clay)				na L		-		<ul> <li>Secondary quartz</li> </ul>	• Clay material (sericite)				:	-					200			· .		
 Identified Minerals and Material	Detrital Material	(⇒80%)	• Quartz, = 40%, < 1.0 mm,	originally rounded $\sim$	subrounded	<ul> <li>Plagioclase,</li></ul>	< 0.5 mm, subrounded	• Alkali feldspar, = 15%,	subrounded, altered to	sericite	• Zircon	(= 60 %)	• Quartz, = 45%, < 0.45 mm,	originally rounded	• Plagioclase, = 30 %,	$< 0.45  \mathrm{mm}$ , rounded,	slightly aftered	• Garnet	• Apatite	• Zircon	Sphene	• Muscovite	• Calcium carbonate (or	dolomite), > 95 %.	• Detrital quartz grains, a few	%, mostly rounded	• Alkali feldspar, rare, altered	the second secon
Microsconic Heatures	Microsophor damies	• Moderately to poorly	sorted	• Well-cemented by	secondarily,	pricipitated silica	(similar to SH-13)					• Moderately ~ well	sorted	Originally porous	sandstone	• Quartz grains are	well cemented by	over growth silica	precipitated during	diagenesis.			• Recrystallized	limestone (dolomite)	• Mosaic texture is	similar to	neomorphic fabric.	
Macrosconic Beatimes	Macroscopic reacures				:							<ul> <li>Light brownish gray</li> </ul>	• Massive	• Porous	• No lamination			-					• Light yellowish	white	• Compact	• Porous	No lamination and	stratified texture.
Sample Name	Sample Manne	SANDSTONE			÷.							SANDSTONE											LIMESTONE					the second of the second second
S of S	0.00	KR-001						: :	:			SH-12											JA-09				1	TO SECURE AND A SECURE

Microscopic Observation of Rocks in Thin Section (Sedimentary Rocks) (9)

Source (or remarks)	Formation: Kambe	Formation: Kambe
Unidentified Minerals and Material	• Clay material	
s and Material Matrix	• Sparry Calcite ( Secondarily precipitated ) ( calcite.	(≥ 55%) • Sparry calcite • Micritic calcite (* Clay material)
Identified Minerals and Material Detrital Material Ma	• Ooid, = 30%, < 2 mm • Detrital Quartz, = 15%, < 2 mm, subangular < 2 mm, subangular • Detrital plagioclase, = 5% • Detrital alkali feldspar • Echinoderm fragments • Zircon	• Ooid, = 35%, < 0.5 mm • Detrital quartz, = 5%, < 1.0 mm • Detrital Plagioclase
Microscopic Features	• Spherical or ellipsoidal grains, showing radial and concentric structure are foolds. (Nuclei of them are probably micrite.) • Matrix among the foolds is sparry calcite cement. • No carbonate-mud in matrix shows "washout" • Rarely, foolds with a large nuclei of quartz and thin foolitic lamina. (Superficial foolds)	Abundant foids with poorly - preserved concentric structure.      Nuclei of them are quartz, calcite, garnet, and foraminifer.      The structure may have been lost by mictritization
Macroscopic Peatures	• Gray • Massive • With dark transparent spots • No lamination or stratification	<ul> <li>Light gray</li> <li>Compact and massive</li> <li>No lamination and stratification</li> </ul>
Sample Name	SANDY OOLITIC LIMESTONE (Sandy öosparite)	SANDY ÖOLITIC LIMESTONE (Sandy, poorly- washed, ōosparite)
Code No.	MW-05	MD-08

## Photomicrographs of Rocks in Thin Section (Sedimentary Rocks)

## Abbreviations

## Minerals

Qtz : quartz Kf : potassium feldspar

Pl : plagioclase Bi : biotite

Hor: hornblende Cpx: clinopyroxene

Ne : nepheline Ol : olivine

Cn: cancrinite Sd: sodalite

Ap : apatite Ti : titanite

Gar : garnet Tor : tourmaline

Zir : zircon Ru : rutile

Chl: chlorite Serp: serpentine

Mus: muscovites Ca: calcite

Cr : cristobalite Se : sericite

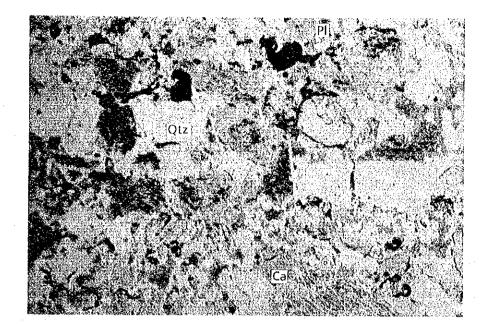
Non: nontronite Sm: smectite

Anl : analcime Lim : limonite

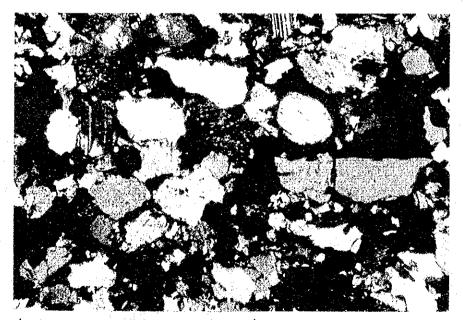
Mt : magnetite

## Others

Cly : clay Opq : opaque minerals



one polar



crossed polars

10 mm

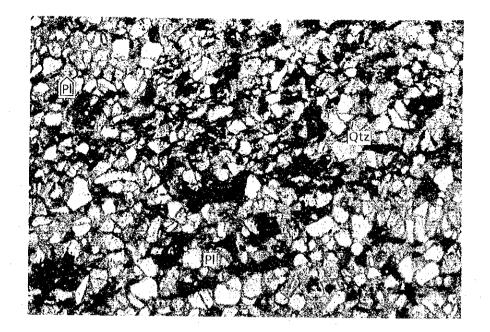
Sample No.: KR-014

Formation: Taru Formation

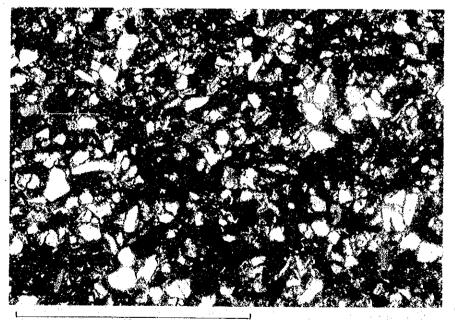
(middle)

Location : East of Taru Town

Rock name : Sandstone



one polar



crossed polars

10 mm

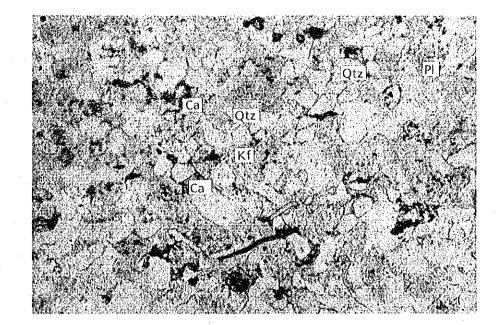
Sample No.: SH-32

Formation: Maji ya Chumvi

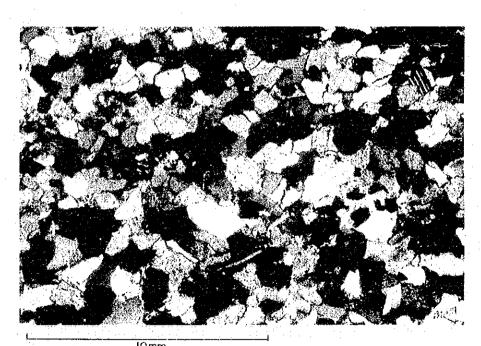
Formation (middle)

Location : West of Bamba

Rock name: Siltstone



one polar



crossed polars

Sample No.: KR-010

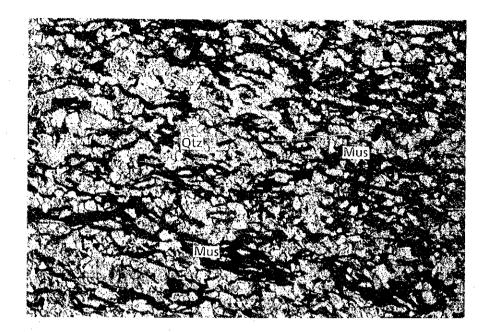
Formation: Maji ya Chumvi

Formation (upper)

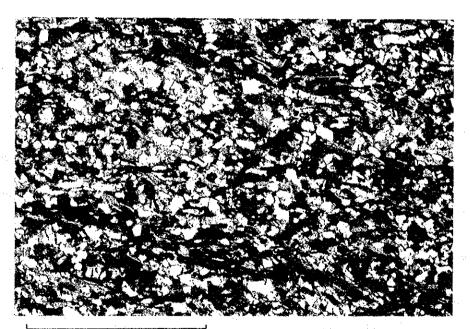
Location : Maji ya Chumvi

Rock name : Sandstone

Photomicrographs (thin section)



one polar



crossed polars

Imm

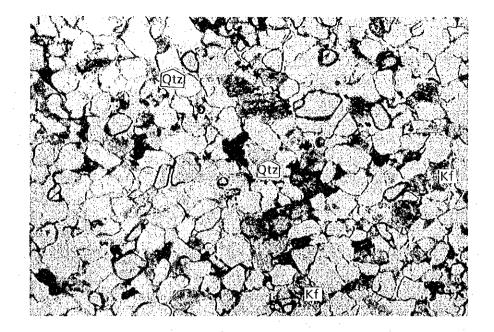
Sample No.: KR-006

Formation: Mariakani Formation

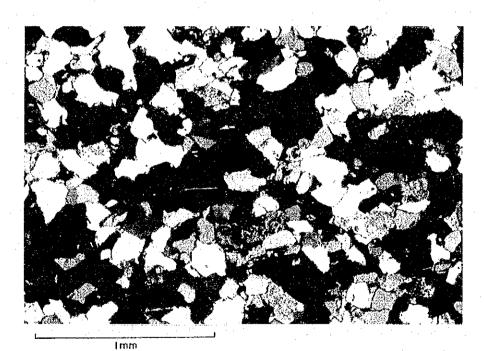
(lower)

Location : Northwest of Mazeras

Rock name: Sandstone



one polar



crossed polars

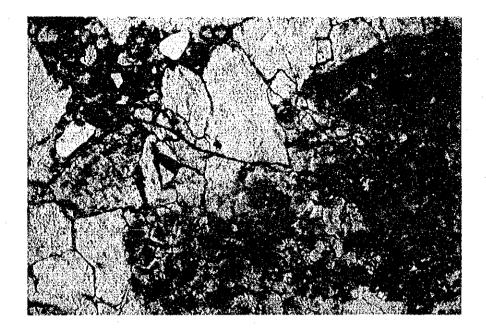
Sample No.: SH-12

Formation: Mazeras Formation

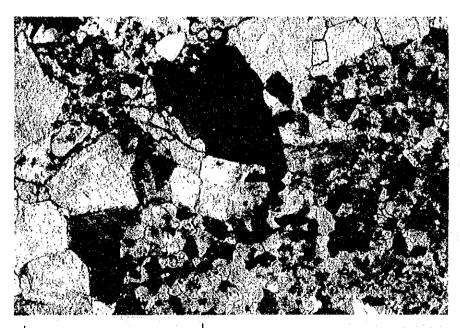
(upper)

Location : South of Bamba

Rock name: Sandstone



one polar



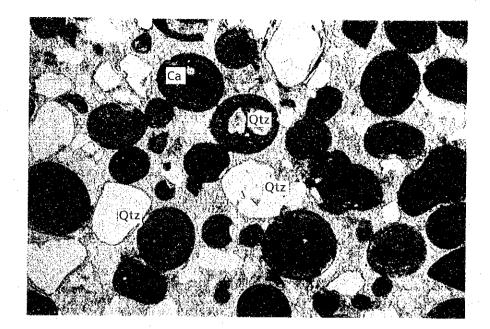
crossed polars

lmin

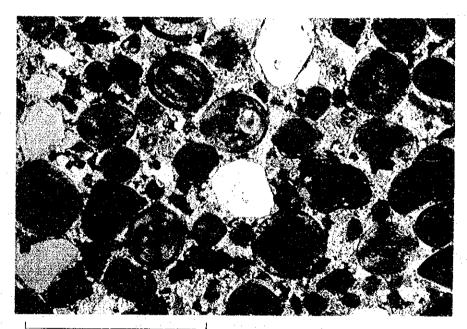
Sample No.: JA-09

Formation: Kambe Formation

Location : Jaribuni Rock name : Limestone



one polar



crossed polars

lmm

Sample No.: MW-05

 $Formation: Kambe\ Formation$ 

Location : Mwachi Forest Rock name : Sandy Ölitic

Limestone