

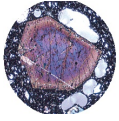
GEL4050 Igneous and Metamorphic Petrology Mineral ID Study Sheet - Practical In-Class Test

Disclaimer: This review is a courtesy of the instructor. While care has been taken to include everything that might be tested, omissions or oversights may have occurred. The instructor shall NOT be liable for any missed answer on your part just because the topic is not explicitly mentioned. It is still the STUDENT'S RESPONSIBILITY to know and be able to use concepts addressed during lectures, labs, or required texts.

Mineral Identification Exam Review Sheet:

- All the listed minerals are "fair game" during the handsample and thin section mineral ID exam as indicated by the ✓mark -

<u>Mineral Name</u>	<u>Chem. Formula</u>	<u>Oxide Formula</u> <i>-As a study exercise, populate yourself-</i>	<u>Identify in handsample</u>	<u>Identify in Thinsection</u>
Augite (Pyroxene)	$\text{Ca}(\text{Mg, Fe, Al})(\text{Al, Si})_2\text{O}_6$		✓	✓
Andalusite	Al_2SiO_5		✓	✓
Biotite (Mica)	$\text{K}(\text{Mg, Fe})_3\text{AlSi}_3\text{O}_{10}(\text{OH})_2$		✓	✓
Calcite	CaCO_3		✓	✓
Chlorite	$(\text{MgFe})_5\text{Al}_2\text{Si}_3\text{O}_{10}(\text{OH})_8$		✓	✓
Dolomite	$\text{CaMg}(\text{CO}_3)_2$		✓	
Garnet Group	$\text{X}_3\text{Y}_2(\text{SiO}_4)_3$ <i>X: divalent metals (Ca, Fe, Mg, &/or Mn)</i> <i>Y: trivalent metals (Al, Cr, Fe, &/or Mn)</i>		✓	✓
Hornblende (Ferro) (Amphibole)	$\text{Ca}_2(\text{Fe}^{2+4} \text{Al})(\text{Si}_7\text{Al})\text{O}_{22}(\text{OH})_2$		✓	✓
Kyanite	Al_2SiO_5		✓	✓
Microcline (Feldspar)	KAlSi_3O_8		✓	
Muscovite (Mica)	$\text{KAl}_3\text{Si}_3\text{O}_{10}(\text{OH})_2$		✓	✓
Olivine <i>Fosterite</i> <i>Fayalite</i>	$(\text{Mg, Fe})\text{SiO}_4$ <i>MgSiO_4</i> <i>FeSiO_4</i>		✓	✓
Orthoclase (Feldspar)	KAlSi_3O_8		✓	✓
Plagioclase (Feldspar) <i>Albite</i> <i>Labradorite</i> <i>Anorthite</i>	<i>$\text{NaAlSi}_3\text{O}_8$</i> <i>solid solution series</i> <i>$\text{CaAl}_2\text{Si}_2\text{O}_8$</i>		✓	✓
Pyroxenes <i>Orthopyroxene</i> <i>Clinopyroxene</i>	Orthorhombic Pyroxenes (parallel extinction) Monoclinic Pyroxenes (inclined extinction)			✓
Quartz	SiO_2		✓	✓
Sillimanite	Al_2SiO_5			✓
Staurolite	$\text{FeAl}_4\text{Si}_2\text{O}_{10}(\text{OH})_2$		✓	✓



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How to practice for this Practical, In-Class Test?

Handsample Identification

The course class & labroom houses hand specimens sets of many of the indicated minerals.

Standard study sets for GEL1010 and subsequent courses are in trays with a green front, stored in a cabinet in SI2012 in the SE corner of the room. These trays have a number and a letter code. Be sure to use trays labeled A as well as B.

Advanced study samples are also in SI2012 in the far SE corner of the room. A metal filing cabinet with slide out drawers has specific minerals in individual containers. You may take out a container at a time to study and replace them when you are done.

Your “Rock/Mineral ID kit” received in GEL1010 as well as the “Advanced Mineral ID kit” from GEL3050 contain mineral samples for study at home and in the lab. Do not forget to study the minerals in the bag with the “Hardness” label included with the GEL 1010 kit in addition to the bag labeled “Minerals”. If you do not have any of these kits mentioned, contact our Lab Coordinator.

Thin-Section Identification

On the South wall counter in SI2012 are small thin-section trays with lids. One of these trays has thin-sections of specific minerals, the other contains igneous and metamorphic rock thin-sections. You may use the Polarized Light Microscopes (PLM) and the mentioned thin-sections for your studies. Please familiarize yourself with the operations of the PLM before you get started. TA's and the instructor can help you. There will also be a in-class review lecture going specifically over the PLM that you do not want to miss.

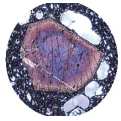
You may also practice virtual thin-section mineral identification and PLM operational procedures with the following software and webpages.

[Optical Mineral Microscope Simulator](#) - EXE file, PC only. Most likely abandonware. Simulator of the Polarized Light Petrographic microscope.

Java Virtual Petrographic Microscope <http://jvpm.sourceforge.net/> Java based software, will run on almost any system with a Java runtime environment.

Virtual Petrographic Microscopes & Collections. **Great for learning and practicing mineral ID in thin-sections:**

- a. https://learn5.open.ac.uk/course/format/sciencelab/section.php?name=petro_vm Free account registration required! Mostly UK samples!
- b. <https://www.virtualmicroscope.org/content/uk-virtual-microscope> Mostly UK samples. They also have a virtual collection on meteorites and lunar and Martian rocks.
- c. <https://planetearth.utsc.utoronto.ca/VirtualMic/> Large selection of interactive igneous & metamorphic thin sections as well as hand samples.




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The following is a COMPLETE sample test (just like the one you will be taking) showing you what you need to know for both the handsample and thin-section mineral identification:


MINERAL IDENTIFICATION PETROGRAPHIC LIGHT MICROSCOPE

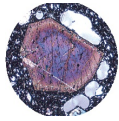


*THIS IS A CLOSED NOTE/BOOK EXAM. Watch the **EXAM SLIDE SHOW**. A mineral in thin section will be shown in PPL (Plain Polarized Light) and XPL (Cross Polarized Light) for ~90 seconds. If needs be, the slideshow can be repeated. You may write down **TWO** mineral names for ½ credit. If you are uncertain about the identity of the mineral you may describe it as best as you can from the presented video (e.g. extinction, relief, birefringence, cleavage, etc.) in the space provided for partial credit (max. 50%) as an alternative.*


1. Video Question #1. 	What is the name of the mineral? (4pts)	Points: /10
	Extinction Angle: <input type="checkbox"/> Parallel <input type="checkbox"/> Inclined <input type="checkbox"/> No Angle (2pts)	
	Pleochroism: <input type="checkbox"/> YES <input type="checkbox"/> NO (1pt)	
	<input type="checkbox"/> Isotropic Mineral <input type="checkbox"/> Anisotropic Mineral (1pt)	
Give one characteristic that made you identify the mineral, e.g. Spinel - isotropic (2pts)		


2. Video Question #2. 	What is the name of the mineral? (4pts)	Points: /10
	Extinction Angle: <input type="checkbox"/> Parallel <input type="checkbox"/> Inclined <input type="checkbox"/> No Angle (2pts)	
	Pleochroism: <input type="checkbox"/> YES <input type="checkbox"/> NO (1pt)	
	<input type="checkbox"/> Isotropic Mineral <input type="checkbox"/> Anisotropic Mineral (1pt)	
Give one characteristic that made you identify the mineral, e.g. Spinel - isotropic (2pts)		

3. Video Question #3. 	What is the name of the mineral? (4pts)	Points: /10
	Extinction Angle: <input type="checkbox"/> Parallel <input type="checkbox"/> Inclined <input type="checkbox"/> No Angle (2pts)	
	Pleochroism: <input type="checkbox"/> YES <input type="checkbox"/> NO (1pt)	
	<input type="checkbox"/> Isotropic Mineral <input type="checkbox"/> Anisotropic Mineral (1pt)	
Give one characteristic that made you identify the mineral, e.g. Spinel - isotropic (2pts)		



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4. Video Question #4. 	What is the name of the mineral? (4pts)	Points: /10
	Extinction Angle: <input type="checkbox"/> Parallel <input type="checkbox"/> Inclined <input type="checkbox"/> No Angle (2pts)	
	Pleochroism: <input type="checkbox"/> YES <input type="checkbox"/> NO (1pt)	
	<input type="checkbox"/> Isotropic Mineral <input type="checkbox"/> Anisotropic Mineral (1pt)	
	Give one characteristic that made you identify the mineral, e.g. Spinel - isotropic (2pts)	

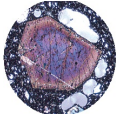
5. Video Question #5. 	What is the name of the mineral? (4pts)	Points: /10
	Extinction Angle: <input type="checkbox"/> Parallel <input type="checkbox"/> Inclined <input type="checkbox"/> No Angle (2pts)	
	Pleochroism: <input type="checkbox"/> YES <input type="checkbox"/> NO (1pt)	
	<input type="checkbox"/> Isotropic Mineral <input type="checkbox"/> Anisotropic Mineral (1pt)	
	Give one characteristic that made you identify the mineral, e.g. Spinel - isotropic (2pts)	

MINERAL IDENTIFICATION HANDSAMPLE

THIS IS A CLOSED NOTE/BOOK EXAM. Obtain mineral samples as listed in each question from the instructor's desk. Perform all tests necessary to identify the mineral using all tools at your disposal. Return mineral sample IMMEDIATELY after identification to instructor's desk. You may write down TWO mineral names for ½ credit. If you are uncertain about the identity of the mineral you may describe the mineral (e.g. cleavage, hardness, luster S.G., etc.) in the space provided for partial credit (max. 50%) as an alternative. NOTE: Some minerals may be presented more than once!

6. Obtain mineral handsample #11 from the instructor's desk.	What is the name of the mineral? (4pts)	Points: /10
	What is the Chemical Sum Formula of the mineral?(4pts)	
	Give one characteristic that made you identify the mineral, e.g. Gold - incredibly dense (2pts)	

7. Obtain mineral handsample #14 from the instructor's desk.	What is the name of the mineral? (4pts)	Points: /10
	What is the OXIDE Formula of the mineral?(4pts)	
	Give one characteristic that made you identify the mineral, e.g. Gold - incredibly dense (2pts)	



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8. Obtain mineral handsample #3 from the instructor's desk.	What is the name of the mineral? (4pts)	Points:
	What is the OXIDE Formula of the mineral?(4pts)	/10
	Give one characteristic that made you identify the mineral, e.g. Gold - incredibly dense (2pts)	

9. Obtain mineral handsample #1 from the instructor's desk.	What is the name of the mineral? (4pts)	Points:
	What is the Chemical Sum Formula of the mineral?(4pts)	/10
	Give one characteristic that made you identify the mineral, e.g. Gold - incredibly dense (2pts)	

10. Obtain mineral handsample #33 from the instructor's desk.	What is the name of the mineral? (4pts)	Points:
	What is the OXIDE Formula of the mineral?(4pts)	/10
	Give one characteristic that made you identify the mineral, e.g. Gold - incredibly dense (2pts)	