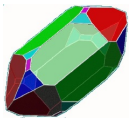


GEL 3050 - Mineralogy - Optical Mineralogy

MINERAL ID TEST - Practical In-class Lab Test Review Sheet

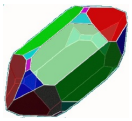
Disclaimer: These reviews are courtesy of the instructor. While care has been taken to include everything that might be tested, omissions or oversights may have occurred. The instructor shall NOT be liable for any missed answer on your part just because the topic is not explicitly mentioned. It is still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

CLOSED Book/Notes! NO written material allowed.

Bring your GEL3050 and GEL1010 lab kits to the final. Next to the mineral name, you need to know chemical formula, crystal structure and mineral group for each.

The following list(s) are for hand-samples:
[1] = included in your GEL1010 Mineral ID kit; [2] = included in your GEL3050 Mineral ID kit
Note: While most of them are, NOT all minerals listed for handsample identification are included in your kits. Some can be had for study in our lab room.

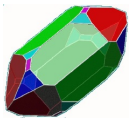
Mineral Name	Chem. Formula	Crystal Structure	Mineral Group
Analcime[2] (Zeolite)	$Na(AlSi_2O_6) \cdot H_2O$	Triclinic	Tectosilicate
Andalusite[2]	Al_2SiO_5	Orthorhombic	Nesosilicate
Anhydrite[2]	$CaSO_4$	Orthorhombic	Sulfate
Apatite[1]	$Ca_5(F_3Cl)(PO_4)_3$	Hexagonal	Phosphate
Augite[2(as diopside)] (Pyroxene)	$Ca(Mg, Fe, Al)(Al,Si)_2O_6$	Monoclinic	Inosilicate
Azurite	$Cu_3(CO_3)_2(OH)_2$	Monoclinic	Carbonate
Barite[1]	$BaSO_4$	Orthorhombic	Sulfate
Bauxite[2]	$Al_2O_3 * 2H_2O$	None	Oxide (Mixture)
Beryl[2]	$Be_3Al_2Si_6O_{18}$	Hexagonal	Cyclosilicate
Biotite[1] (Mica)	$K(Mg,Fe)_3AlSi_3O_{10}(OH)_2$	Monoclinic (small angle)	Phyllosilicate
Bornite[1(coating on chalcopyrite)]	Cu_5FeS_4	Isometric	Sulphide
Calcite[1]	$CaCO_3$	Hexagonal-Rhombohedral	Carbonate
Cassiterite[2]	SnO_2	Tetragonal	Oxide
Chalcopyrite[1]	$CuFeS_2$	Tetragonal	Sulphide
Chlorite[1]	$(MgFe)_5Al_2Si_3O_{10}(OH)_8$	Monoclinic	Phyllosilicate
Chromite[2]	$Fe_2Cr_2O_4$	Isometric	Oxide



GEL 3050 - Mineralogy - Optical Mineralogy

MINERAL ID TEST - Practical In-class Lab Test Review Sheet

Mineral Name	**Chem. Formula**	**Crystal Structure**	**Mineral Group**
Copper[1]	Cu	Isometric	Native Mineral
Corundum[1]	Al_2O_3	Hexagonal	Oxide
Cuprite[2]	Cu_2O	Isometric	Oxide
Dolomite	$CaMg(CO_3)_2$	Hexagonal-Rhombohedral	Carbonate
Epidote[2]	$Ca_2(Al,Fe)_3(SiO_4)_3OH$	Monoclinic	Sorosilicate
Fluorite[1]	CaF_2	Isometric	Halide
Galena[1]	PbS	Isometric	Sulphide
Garnet Group[2]	$X_3Y_2(SiO_4)_3$ *X: divalent metals (Ca, Fe, Mg, &/or Mn)* *Y: trivalent metals (Al, Cr, Fe, &/or Mn)*	Isometric	Nesosilicate
Graphite	C	Hexagonal-Rhombohedral	Native Mineral
Gypsum[1]	$CaSO_4*2H_2O$	Monoclinic	Sulfate
Halite[1]	NaCl	Isometric	Halide
Hematite[1]	Fe_2O_3	Hexagonal-Rhombohedral	Oxide
Hornblende[1] (Amphibole)	$Ca_2Na(Mg,Fe)_4(Al, Fe,Ti)_3Si_6O_{22}(O,OH)_2$	Monoclinic	Inosilicate
Ilmenite[2]	$FeTiO_3$	Hexagonal	Oxide
Kaolinite[1] (Clay)	$Al_2Si_2O_5(OH)_4$	Monoclinic	Phyllosilicate
Kyanite[2]	Al_2SiO_5	Triclinic	Nesosilicate
Limonite[1(w/ Hematite)]	$FeO(OH)*nH_2O$	None	Oxide
Magnetite[1]	Fe_3O_4	Isometric	Oxide
Malachite	$Cu_2CO_3(OH)_2$	Monoclinic	Carbonate
Microcline[2] (Feldspar)	$KAlSi_3O_8$	Triclinic	Tectosilicate
Molybdenite[2]	MoS_2	Hexagonal	Sulphide
Muscovite[1] (Mica)	$KAl_3Si_3O_{10}(OH)_2$	Monoclinic	Phyllosilicate
Olivine[1] *Fosterite* *Fayalite*	$(Mg,Fe)SiO_4$ *$MgSiO_4$* *$FeSiO_4$*	Orthorhombic	Nesosilicate
Orthoclase[1] (Feldspar)	$KAlSi_3O_8$	Monoclinic	Tectosilicate



GEL 3050 - Mineralogy - Optical Mineralogy

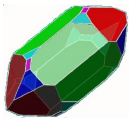
MINERAL ID TEST - Practical In-class Lab Test Review Sheet

Mineral Name	**Chem. Formula**	**Crystal Structure**	**Mineral Group**
Plagioclase[1] (Feldspar) *Albite* *Labradorite* *Anorthite*	 $NaAlSi_3O_8$ *solid solution series* $CaAl_2Si_2O_8$	Triclinic	Tectosilicate
Pyrite[1]	FeS_2	Isometric	Sulphide
Pyrolusite	MnO_2	Tetragonal	Oxide
Quartz[1]	SiO_2	Hexagonal	Tectosilicate
Rutile	TiO_2	Tetragonal	Oxide
Sillimanite[2]	Al_2SiO_5	Orthorhombic	Nesosilicate
Sphalerite[2]	ZnS *(may contain Fe, Mn, Cd)*	Isometric	Sulphide
Staurolite[2]	$FeAl_4Si_2O_{10}(OH)_2$	Pseudo-Orthorhombic	Nesosilicate
Stibnite[2]	Sb_2S_3	Orthorhombic	Sulphide
Sulphur	S	Orthorhombic	Native Mineral
Sylvite[2]	KCl	Isometric	Halide
Talc[1]	$Mg_3Si_4O_{10}(OH)_2$	Monoclinic	Phyllosilicate
Topaz[1]	$Al_2SiO_4(F,OH)$	Orthorhombic	Nesosilicate
Tourmaline[2]	$Na(Mg,Fe,Li,Al,Mn)_3Al_6(BO_3)_3(Si_6O_{18})(OH,F)_4$	Hexagonal	Cyclosilicate
Tremolite[2] (Amphibole)	$Ca_2Mg_5Si_8O_{22}(OH)_2$	Monoclinic	Inosilicate
Wollastonite[2] (Pyroxene)	$CaSiO_3$	Triclinic / Monoclinic	Inosilicate
Zircon	$ZrSiO_4$	Tetragonal	Nesosilicate

GEL 3050 - Mineralogy - Optical Mineralogy

MINERAL ID TEST - Practical In-class Lab Test Review Sheet

 MINERALS BAG 6 Samples	Minerals in Bag: analcime anhydrite beryl borax diopside (~Augite) epidote microcline sylvite tourmaline tremolite wollastonite
 METAMORPHIC MINERAL BAG 4 Samples	Minerals in Bag: andalusite garnet kyanite sillimanite staurolite
 ORE MINERALS BAG 5 Samples	Minerals in Bag: bauxite cassiterite chromite cuprite ilmenite molybdenite sphalerite stibnite



GEL 3050 - Mineralogy - Optical Mineralogy

MINERAL ID TEST - Practical In-class Lab Test Review Sheet

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BE ABLE TO IDENTIFY THE FOLLOWING MINERALS IN ACTUAL THIN SECTIONS WITHOUT THE AID OF ANY WRITTEN MATERIALS:

Mineral Name	Key Features in Thin Section	Optical Data
Andalusite	hi relief, euhedral, cloudy; XPL: max. 1st order yellow, penetration twin cross	RI: 1.629-1.650 Biaxial - Biref: 0.009 2V: 48-68°
Augite (Pyroxene)	clear - subtle pink, slight pleochroic (Ti), 90° cleavage; XPL: 2nd order colors; inclined sometimes parallel extinction	RI: 1.680-1.729 Biaxial + Biref: 0.026 2V: 40-52°
Biotite (Mica)	mica cleav., green, brown, pleo., zircon halos; XPL: little color change, bark tex.	RI: 1.565-1.675 Biaxial - Biref: 0.04-0.05 2V: 0-25°
Calcite	high relief; XPL: very hi order pastel colors, rainbow cross-hatches	RI: 1.486-1.660 Uniaxial - Biref: 0.154-0.174
Chlorite	slight green, slight pleo.,matted felt; XPL: 1st order grey, few grains color anom.	RI: 1.571-1.599 Biaxial + Biref: 0.005-0.011 2V: 0-40°
Epidote	hi relief, colorless - pale yellow grn, XPL: up to 3rd order	RI: 1.723-1.797 Biaxial - Biref: 0.013-0.046 2V: 64-89°
Garnet Group	med relief, clear to very slight pink, dust inclusions; XPL: isotropic	RI: ~1.7-1.8 Isotropic
Hornblende (Amphibole)	greenish, pleochroic, 60° cleavage; XPL: 1st - 2nd order colors; symmetrical extinction	RI: 1.614-1.701 Biaxial - Biref: 0.019-0.026 2V: 52-85°
Kyanite	hi relief, cleavage, clear to pale blue, rare pleo.; XPL: 1st order, largest extinction	RI: 1.712-1.734 Biaxial - Biref: 0.015-0.016 2V: 82°
Muscovite (Mica)	low relief, mica cleavage; XPL: 1st order colors	RI: 1.552-1.616 Biaxial ± Biref: 0.034-0.042 2V: 30-47°
Olivine *Fosterite* - *Fayalite*	no cleavage; XPL: colorful stained glass window appearance, 2nd - 3rd order	RI: 1.630-1.690 Biaxial + Biref: 0.04 2V: 46-98°
Orthoclase (Feldspar)	low relief; XPL: 1st order greys, cross hatch tartan twinning	RI: 1.518-1.524 Biaxial - Biref: 0.005-0.006 2V: 65-75°

Mineral Name	Key Features in Thin Section	Optical Data
Plagioclase (Feldspar)	low relief; XPL: 1st order greys, Albite / Carlsbad parallel tiger stripe twinning	Albite: RI: 1.528-1.542 Biaxial + Biref: 0.009-0.01 2V: 45° Labradorite: RI: 1.554-1.573 Biaxial + Biref: 0.008-0.01 2V: 85° Anorthite: RI: 1.572-1.588 Biaxial - Biref: 0.011-0.012 2V: 78°
Quartz	low relief; XPL: 1st order greys, undulose extinction	RI: 1.553-1.544 Uniaxial + Biref: 0.009
Sillimanite	hi relief, needle - blades, clear, square x-sec.; XPL: upper 2nd order	RI: 1.653-1.684 Biaxial + Biref: 0.016-0.023 2V: 20-30°
Sphene / Titanite	sub- euhedral brown - pink wedges, hi relief; XPL: little color change (hi whites)	RI: 1.840-2.11 Biaxial + Biref: 0.103-0.160 2V: 20-56°
Staurolite	honey yellow, pleo., poikiloblastic; XPL: little color change (low biref.)	RI: 1.736-1.762 Biaxial + Biref: 0.009-0.015 2V: 88°
Tourmaline	high relief, needles, triangles, very pleochroic; XPL: high order colors; longitudinal parallel extinction	RI: 1.610-1.698 Uniaxial - Biref: 0.035
Zircon	clear, euhedral very hi relief; XPL: high 3rd to 4th order colors	RI: 1.920-2.015 Uniaxial - Biref: 0.047-0.055

An EXACT replica of the
GEL3050 MINERAL ID in-class TEST
is given below on the next pages.
All the questions will be exactly the same.
Only the mineral samples associated with each question will be randomized and different for each student!

Note: The numbering system on the exam has NO reference to any numbering system used in the classroom sets for study

Name: ***EXACT replica of the GEL3050 MINERAL ID in-class TEST***	
GRADE:	**/40 = %**

Instructions

This is a closed book / note exam with the exception of the Michel-Levy Birefringence chart in your Lab Manual on p.76. YOU MAY USE THIS CHART, but nothing else in the manual. Other than that, you are NOT allowed to use ANY written material, including booklets, pamphlets, and trifold brochures that came in any of your kits.

You may use calculators (NO cell-phone!) and ALL the tools from your GEL1010 & GEL3050 LAB kits.

You may also use the samples from your Mineral samples from your kits as long as:

- there is NO writing on these minerals such as numbers or samples pasted on labels
- NO minerals are sorted into compartment boxes
- OK with multiple specimens in Ziplock bags as originally packaged in your kits.

This Final has TWO parts, a HAND-SAMPLE PART and a THIN-SECTION PART. To avoid bottlenecks, half the class will start with the HAND-SAMPLE PART and the other half will start with the THIN-SECTION PART.

HAND-SAMPLE PART

Come to the instructor's desk to pick up ONE sample at a time for testing and analysis. You may come back later to get a different specimen of the same sample if desired. Replace the specimen promptly after your testing and analysis is complete, so others with the same assigned sample do NOT have to wait.

THIN-SECTION PART

Set up a Polarized Light Microscope of your choice for the thin section investigation. Pick up ONE assigned slide at a time from the instructor's desk and carry carefully in your open hand. YOU WILL BE RESPONSIBLE FOR NOT DROPPING OR DAMAGING THE SLIDE (or you may be charged with the replacement cost in either time or money). Use your petrographic microscope to investigate. Replace the slide promptly and carefully after your testing and analysis is complete, so others with the same assigned sample do NOT have to wait.

HAND-SAMPLE PART

Come to the instructor's desk to pick up ONE sample at a time for testing and analysis. You may come back later to get a different specimen of the same sample if desired. Replace the specimen promptly after your testing and analysis is complete, so others with the same assigned sample do NOT have to wait.

1. /5	Points	MINERAL IDENTIFICATION: Obtain **Mineral Sample #31** from the instructor. Test the mineral as indicated and complete the answers below: - *Note: Minerals may contain impurities. Make sure you test the actual mineral.*
	/2	Mineral Name of Sample #31: *You may write down two mineral names for ½ credit. Or Unsure about a Name? You may "buy" a letter from the instructor for -0.5 points!*
	/1	Chemical formula of Sample #31:
	/0.5	Crystal Class / Group of Sample #31: *Bubble in your correct answer:* ❍ Isometric ❍ Tetragonal ❍ Orthorhombic ❍ Monoclinic ❍ Triclinic ❍ Hexagonal ❍ Hex.-Rhombohedral
	/0.5	Mineral Group of Sample #31: *Bubble in your correct answer:* ❍ Nesosilicate ❍ Sorosilicate ❍ Inosilicate (Pyroxene) ❍ Inosilicate (Amphibole) ❍ Cyclosilicate ❍ Tectosilicate ❍ Phyllosilicate (Mica) ❍ Phyllosilicate (Clay) ❍ Sulfide ❍ Sulfate ❍ Carbonate ❍ Oxide ❍ Phosphate (or related) ❍ Halide ❍ Native
	/0.5	Specific Gravity of Sample #31: *Give a number, NOT a range!*
	/0.5	Approximate Mohs Hardness of Sample #31: *Give a number, NOT a range!*

2. /5	Points	MINERAL IDENTIFICATION: Obtain **Mineral Sample #24** from the instructor. Test the mineral as indicated and complete the answers below: - Note: Minerals may contain impurities
	/2	Mineral Name of Sample #24: *You may write down two mineral names for ½ credit. Or Unsure about a Name? You may "buy" a letter from the instructor for -0.5 points!*
	/1	Chemical formula of Sample #24:
	/0.5	Crystal Class / Group of Sample #24: *Bubble in your correct answer:* ❍ Isometric ❍ Tetragonal ❍ Orthorhombic ❍ Monoclinic ❍ Triclinic ❍ Hexagonal ❍ Hex.-Rhombohedral
	/0.5	Mineral Group of Sample #24: *Bubble in your correct answer:* ❍ Nesosilicate ❍ Sorosilicate ❍ Inosilicate (Pyroxene) ❍ Inosilicate (Amphibole) ❍ Cyclosilicate ❍ Tectosilicate ❍ Phyllosilicate (Mica) ❍ Phyllosilicate (Clay) ❍ Sulfide ❍ Sulfate ❍ Carbonate ❍ Oxide ❍ Phosphate (or related) ❍ Halide ❍ Native
	/0.5	Specific Gravity of Sample #24: *Give a number, NOT a range!*
	/0.5	Approximate Mohs Hardness of Sample #24: *Give a number, NOT a range!*

Come to the instructor's desk to pick up ONE sample at a time for testing and analysis. You may come back later to get a different specimen of the same sample if desired. Replace the specimen promptly after your testing and analysis is complete, so others with the same assigned sample do NOT have to wait.

3. /5	Points	MINERAL IDENTIFICATION: Obtain **Mineral Sample #57** from the instructor. Test the mineral as indicated and complete the answers below: - Note: Minerals may contain impurities
	/2	Mineral Name of Sample #57: *You may write down two mineral names for ½ credit. Or Unsure about a Name? You may "buy" a letter from the instructor for -0.5 points!*
	/1	Chemical formula of Sample #57:
	/0.5	Crystal Class / Group of Sample #57: *Bubble in your correct answer:* ❍ Isometric ❍ Tetragonal ❍ Orthorhombic ❍ Monoclinic ❍ Triclinic ❍ Hexagonal ❍ Hex.-Rhombohedral
	/0.5	Mineral Group of Sample #57: *Bubble in your correct answer:* ❍ Nesosilicate ❍ Sorosilicate ❍ Inosilicate (Pyroxene) ❍ Inosilicate (Amphibole) ❍ Cyclosilicate ❍ Tectosilicate ❍ Phyllosilicate (Mica) ❍ Phyllosilicate (Clay) ❍ Sulfide ❍ Sulfate ❍ Carbonate ❍ Oxide ❍ Phosphate (or related) ❍ Halide ❍ Native
	/0.5	Specific Gravity of Sample #57: *Give a number, NOT a range!*
	/0.5	Approximate Mohs Hardness of Sample #57: *Give a number, NOT a range!*

4. /5	Points	MINERAL IDENTIFICATION: Obtain **Mineral Sample #10** from the instructor. Test the mineral as indicated and complete the answers below: - Note: Minerals may contain impurities
	/2	Mineral Name of Sample #10: *You may write down two mineral names for ½ credit. Or Unsure about a Name? You may "buy" a letter from the instructor for -0.5 points!*
	/1	Chemical formula of Sample #10:
	/0.5	Crystal Class / Group of Sample #10: *Bubble in your correct answer:* ❍ Isometric ❍ Tetragonal ❍ Orthorhombic ❍ Monoclinic ❍ Triclinic ❍ Hexagonal ❍ Hex.-Rhombohedral
	/0.5	Mineral Group of Sample #10: *Bubble in your correct answer:* ❍ Nesosilicate ❍ Sorosilicate ❍ Inosilicate (Pyroxene) ❍ Inosilicate (Amphibole) ❍ Cyclosilicate ❍ Tectosilicate ❍ Phyllosilicate (Mica) ❍ Phyllosilicate (Clay) ❍ Sulfide ❍ Sulfate ❍ Carbonate ❍ Oxide ❍ Phosphate (or related) ❍ Halide ❍ Native
	/0.5	Specific Gravity of Sample #10: *Give a number, NOT a range!*
	/0.5	Approximate Mohs Hardness of Sample #10: *Give a number, NOT a range!*

Come to the instructor's desk to pick up ONE sample at a time for testing and analysis. You may come back later to get a different specimen of the same sample if desired. Replace the specimen promptly after your testing and analysis is complete, so others with the same assigned sample do NOT have to wait.

5. /5	Points	MINERAL IDENTIFICATION: Obtain **Mineral Sample #23** from the instructor. Test the mineral as indicated and complete the answers below: - Note: Minerals may contain impurities
	/2	Mineral Name of Sample #23: *You may write down two mineral names for ½ credit. Or Unsure about a Name? You may "buy" a letter from the instructor for -0.5 points!*
	/1	Chemical formula of Sample #23:
	/0.5	Crystal Class / Group of Sample #23: *Bubble in your correct answer:* ❍ Isometric ❍ Tetragonal ❍ Orthorhombic ❍ Monoclinic ❍ Triclinic ❍ Hexagonal ❍ Hex.-Rhombohedral
	/0.5	Mineral Group of Sample #23: *Bubble in your correct answer:* ❍ Nesosilicate ❍ Sorosilicate ❍ Inosilicate (Pyroxene) ❍ Inosilicate (Amphibole) ❍ Cyclosilicate ❍ Tectosilicate ❍ Phyllosilicate (Mica) ❍ Phyllosilicate (Clay) ❍ Sulfide ❍ Sulfate ❍ Carbonate ❍ Oxide ❍ Phosphate (or related) ❍ Halide ❍ Native
	/0.5	Specific Gravity of Sample #23: *Give a number, NOT a range!*
	/0.5	Approximate Mohs Hardness of Sample #23: *Give a number, NOT a range!*

6. /5	Points	MINERAL IDENTIFICATION: Obtain **Mineral Sample #19** from the instructor. Test the mineral as indicated and complete the answers below: - Note: Minerals may contain impurities
	/2	Mineral Name of Sample #19: *You may write down two mineral names for ½ credit. Or Unsure about a Name? You may "buy" a letter from the instructor for -0.5 points!*
	/1	Chemical formula of Sample #19:
	/0.5	Crystal Class / Group of Sample #19: *Bubble in your correct answer:* ❍ Isometric ❍ Tetragonal ❍ Orthorhombic ❍ Monoclinic ❍ Triclinic ❍ Hexagonal ❍ Hex.-Rhombohedral
	/0.5	Mineral Group of Sample #19: *Bubble in your correct answer:* ❍ Nesosilicate ❍ Sorosilicate ❍ Inosilicate (Pyroxene) ❍ Inosilicate (Amphibole) ❍ Cyclosilicate ❍ Tectosilicate ❍ Phyllosilicate (Mica) ❍ Phyllosilicate (Clay) ❍ Sulfide ❍ Sulfate ❍ Carbonate ❍ Oxide ❍ Phosphate (or related) ❍ Halide ❍ Native
	/0.5	Specific Gravity of Sample #19: *Give a number, NOT a range!*
	/0.5	Approximate Mohs Hardness of Sample #19: *Give a number, NOT a range!*

THIN-SECTION PART

Set up a Polarized Light Microscope of your choice for the thin section investigation. Pick up ONE assigned slide at a time from the instructor's desk and carry carefully in your open hand. YOU WILL BE RESPONSIBLE FOR NOT DROPPING OR DAMAGING THE SLIDE (or you may be charged with the replacement cost in either time or money). Use your petrographic microscope to investigate. Replace the slide promptly and carefully after your testing and analysis is complete, so others with the same assigned sample do NOT have to wait.

7.	Points /1	THIN-SECTION THICKNESS ESTIMATION: Obtain **Thin-Section Slide #15** from the instructor. This slide is "unfinished". What is the current estimated THICKNESS of this thin-section? *Give a number WITH units, NOT a range!*

8.	Points /3	THIN-SECTION MINERAL IDENTIFICATION: Obtain **Thin-Section Slide #22** from the instructor. Identify ALL major minerals in the section and list them BY MINERAL NAME preferably in order of abundance!
	/1	THIN-SECTION INVESTIGATION: Obtain **Thin-Section Slide #22** from the instructor. List ONE observable feature unique to this thin-section using the appropriate terminology!

9.	Points /1	THIN-SECTION OPTICAL PROPERTY IDENTIFICATION: Obtain **Thin-Section Slide #51** from the instructor. This slide contains a single mineral. The mineral is optically ❍ Uniaxial ❍ Biaxial ❍ Isotropic *Bubble in your correct answer* The mineral's optic sign is ❍ Positive (+) ❍ Negative (-) ❍ Isotropic, NO optic sign *Bubble in your correct answer* If Biaxial, the approximate 2V angle is _____ or ❍ NOT biaxial, NO 2V angle

10.	Points /3	THIN-SECTION MINERAL IDENTIFICATION: Obtain **Thin-Section Slide #26** from the instructor. Identify ALL major minerals in the section and list them BY MINERAL NAME preferably in order of abundance!

11.	Points /1	THIN-SECTION REFRACTIVE INDEX ESTIMATION: Obtain **Thin-Section Slide #10** from the instructor. This slide consists of a light and dark part. When comparing these two areas to each other within the slide, which one, in general, has the higher RI ? ❍ Light area has higher RI ❍ Dark area has higher RI ❍ Neither, RI approx. equal *Bubble in your correct answer*

Bonus Question (extra credit)	Points /4	THIN-SECTION MINERAL IDENTIFICATION: Obtain **Thin-Section Slide #20** from the instructor. Identify ALL major minerals in the section and list them BY MINERAL NAME preferably in order of abundance!