

GY111 Earth Materials Laboratory Exercise 1: Minerals

Minerals Problem Set

Problem 1: What is a polymorph? List three pairs of minerals that are Polymorphs.

Definition(4 points):

1 (2 pt.s). _____ & _____

2 (2 pt.s). _____ & _____

3 (2 pt.s). _____ & _____

Problem 2: For the following minerals list in the space provided their characteristic crystal form (shape) (3 points each):

Galena > _____

Calcite > _____

Garnet > _____

Magnetite > _____

Quartz > _____

Problem 3: In the space provided list the economic uses associated with the mineral (2 points each):

1. Calcite > _____

2. Gypsum > _____

3. Fluorite > _____

4. Magnetite > _____

5. Graphite > _____

6. Halite > _____

7. Galena > _____

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8. Quartz > _____
9. Sulfur > _____
10. Sphalerite > _____

Problem 4: Match the chemical formula to the mineral name (2 points each):

- | | | |
|-------------------|-------|--|
| 1. Copper | _____ | A. CaCO_3 |
| 2. Quartz | _____ | B. NaCl |
| 3. Garnet | _____ | C. Fe_2O_3 |
| 4. Dolomite | _____ | D. KAlSi_3O_8 |
| 5. Olivine | _____ | E. CuFeS_2 |
| 6. Calcite | _____ | F. SiO_2 |
| 7. Hematite | _____ | G. $(\text{Mg,Fe})_2\text{SiO}_4$ |
| 8. K-Feldspar | _____ | H. $(\text{Ca,Mg,Fe,Mn})_3\text{Al}_2\text{Si}_3\text{O}_{12}$ |
| 9. Halite | _____ | I. Cu |
| 10. Chalcopryrite | _____ | J. $\text{CaMg}(\text{CO}_3)_2$ |

Problem 5 (15 points): Suppose that you have inherited 100,000 metric tons of Chalcopryrite ore from your great uncle who was the owner of a mining company. Calculate the number of metric tons of pure copper that are contained in the ore. Assuming a market price of \$2,500 per metric ton of Cu how much would the inheritance be worth?

Note:

Chemical formula for Chalcopryrite is CuFeS_2

Web site for calculating molecular weights: <http://www.ch.cam.ac.uk/magnus/PeriodicTable.html>

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Problem 6: List the chemical group (Oxides, Halides, etc.) and mineral name for each mineral formula (2 points each):

Formula	Mineral Name	Chemical Group
1. NaAlSi ₃ O ₈	_____	_____
2. ZnS	_____	_____
3. CaCO ₃	_____	_____
4. Ca(Mg,Fe)Si ₂ O ₆	_____	_____
5. Fe ₃ O ₄	_____	_____
6. KAl ₃ Si ₃ O ₁₀ (OH) ₂	_____	_____
7. CaSO ₄	_____	_____
8. Al ₂ SiO ₅	_____	_____
9. KCl	_____	_____
10. Ag	_____	_____