

GEOL3010

Mineral Classification

Exercise 1

Listed below are the various chemical classifications of the minerals

Native Element	Orthosilicate (Nesosilicates)
Sulfide	(Isolated SiO_4 groups)
Halide	Sorosilicate (Si_2O_7 groups)
Oxide	Cyclosilicate (Si_6O_{18} rings)
Hydroxide	Chain silicate (SiO_3 or Si_4O_{11} Chains)
Carbonate	Sheet Silicate (Si_4O_{10} sheets)
Sulfate	Framework Silicate (SiO_2 framework)
Phosphate	

Give the classification for the following minerals:

For the oxygen-bearing minerals, also give the valences of the various cations

1. Gold (Au) _____
2. Pyrite (FeS_2) _____
3. Hematite (Fe_2O_3) _____
4. Witherite (BaCO_3) _____
5. Barite (BaSO_4) _____
6. Sphalerite (ZnS) _____
7. Tridymite (SiO_2) _____
8. Covellite (CuS) _____
9. Coesite (SiO_2) _____
10. Realgar (AsS) _____
11. Halite (NaCl) _____
12. Sylvite (KCl) _____
13. Cuprite (Cu_2O) _____
14. Galena (PbS) _____
15. Periclase (MgO) _____
16. Pyrrhotite (Fe_{1-x}S) _____
17. Corundum (Al_2O_3) _____
18. Kamacite (Fe) _____
19. Magnetite (Fe_3O_4) _____
20. Rutile (TiO_2) _____

21. Brucite ($\text{Mg}(\text{OH})_2$) _____
22. Goethite (FeOOH) _____
23. Calcite (CaCO_3) _____
24. Calcopyrite (CuFeS_2) _____
25. Dolomite ($\text{CaMg}(\text{CO}_3)_2$) _____
26. Anhydrite (CaSO_4) _____
27. Sulfur (S) _____
28. Apatite ($\text{Ca}_5(\text{PO}_4)_3(\text{OH})$) _____

Silicates (Try these based on the formulas above, but you may also want to look these up)

29. Enstatite (MgSiO_3) _____
30. Pyrope (Garnet) $\text{Mg}_3\text{Al}_2\text{Si}_3\text{O}_{12}$ _____
31. Zircon (ZrSiO_4) _____
32. Wollastonite (CaSiO_3) _____
33. Lawsonite $\text{CaAl}_2(\text{Si}_2\text{O}_7)(\text{OH})_2 \bullet \text{H}_2\text{O}$ _____
34. Beryl ($\text{Be}_3\text{Al}_2(\text{Si}_6\text{O}_{18})$) _____
35. Anthophyllite $\text{Mg}_7\text{Si}_8\text{O}_{22}(\text{OH})_2$ _____
36. Phlogopite $\text{KMg}_3(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$ _____
37. Quartz (SiO_2) _____
38. Kyanite (Al_2SiO_5) _____
39. Anorthite ($\text{CaAl}_2\text{Si}_2\text{O}_8$) (Feldspar) _____
40. Albite ($\text{NaAlSi}_3\text{O}_8$) (feldspar) _____
41. Chabazite ($\text{Ca}_2(\text{Al}_2\text{Si}_4\text{O}_{12}) \bullet 6\text{H}_2\text{O}$) _____
42. Forsterite (Mg_2SiO_4) _____