

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) Native Element
2. Forsterite (Mg_2SiO_4) Orthosilicate Mg^{2+} Si^{4+}
3. Pyrite (FeS_2) Sulfide
4. Witherite (BaCO_3) Carbonate Ba^{2+} C^{4+}
5. Barite (BaSO_4) Sulfate Ba^{2+} S^{6+}
6. Sphalerite (ZnS) Sulfide
7. Tridymite (SiO_2) Framework Silicate Si^{4+}
8. Covellite (CuS) Sulfide
9. Coesite (SiO_2) Framework Silicate Si^{4+}
10. Realgar (AsS) Sulfide
11. Halite (NaCl) Halide Na^+
12. Sylvite (KCl) Halide K^+
13. Cuprite (Cu_2O) Oxide Cu^{1+}
14. Galena (PbS) Sulfide
15. Periclase (MgO) Oxide Mg^{2+}
16. Albite ($\text{NaAlSi}_3\text{O}_8$) Framework Silicate Si^{4+}
17. Corundum (Al_2O_3) Oxide Al^{3+}
18. Enstatite (MgSiO_3) Chain Silicate Mg^{2+} Si^{4+}
19. Kamacite (Fe) Native Element
20. Magnetite (Fe_3O_4) Oxide Fe^{2+} Fe^{3+}

21. Rutile (TiO_2) Oxide Ti^{4+}
22. Brucite ($\text{Mg}(\text{OH})_2$) Hydroxide Mg^{2+}
23. Goethite (FeOOH) Hydroxide Fe^{3+}
24. Calcite (CaCO_3) Carbonate Ca^{2+} C^{4+}
25. Wollastonite (CaSiO_3) Chain Silicate Mg^{2+} Si^{4+}
26. Dolomite ($\text{CaMg}(\text{CO}_3)_2$) Carbonate Ca^{2+} Mg^{2+} C^{4+}
27. Anhydrite (CaSO_4) Sulfate Ca^{2+} S^{6+}
28. Sulfur (S) Native Element
29. Apatite ($\text{Ca}_5(\text{PO}_4)_3(\text{OH})$) Phosphate Ca^{2+} P^{5+} H^+
30. Pyrope (Garnet) $\text{Mg}_3\text{Al}_2\text{Si}_3\text{O}_{12}$ Orthosilicate Mg^{2+} Al^{3+} Si^{4+}
31. Calcopyrite (CuFeS_2) Sulfide
32. Zircon (ZrSiO_4) Orthosilicate Zr^{4+} Si^{4+}
33. Lawsonite $\text{CaAl}_2(\text{Si}_2\text{O}_7)(\text{OH})_2 \bullet \text{H}_2\text{O}$ Sorosilicate Ca^{2+} Al^{3+} Si^{4+}
34. Beryl ($\text{Be}_3\text{Al}_2(\text{Si}_6\text{O}_{18})$) Cyclosilicate Be^{2+} Al^{3+} Si^{4+}
35. Pyrrhotite (Fe_{1-x}S) Sulfide
36. Anthophyllite $\text{Mg}_7\text{Si}_8\text{O}_{22}(\text{OH})_2$ Chain Silicate Mg^{2+} Si^{4+}
37. Hematite (Fe_2O_3) Oxide Fe^3
38. Phlogopite $\text{KMg}_3(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$ Sheet Silicate K^+ Mg^{2+} Al^{3+} Si^{4+}
39. Quartz (SiO_2) Framework Silicate Si^{4+}
40. Kyanite (Al_2SiO_5) Orthosilicate Al^{3+} Si^{4+}
41. Anorthite ($\text{CaAl}_2\text{Si}_2\text{O}_8$) Framework Silicate Ca^{2+} Al^{3+} Si^{4+}
42. Chabazite ($\text{Ca}_2(\text{Al}_2\text{Si}_4\text{O}_{12}) \bullet 6\text{H}_2\text{O}$) Framework Silicate Ca^{2+} Al^{3+} Si^{4+}