GLY 4200C NAME_____
HOMEWORK 4

# Ionic Valance in Mineral Formulas

Guidelines:

In mineral formulas, the following guidelines are useful in determining the valance of an ion.

1. Oxygen ion have a charge of -2

2. Alkali metals ions have a charge of +1

3. Alkaline earth ions have a charge of +2

4. Halogen ions have a charge of -1

5. Sulfur anion has a charge of -2, in sulfide minerals
   Exception: When sulfur is present as the $S_2$ dimer, it has a charge of -1

6. Silicon is usually +4

7. Aluminum is usually +3

8. Water molecules are neutral, so there presence in a mineral formula may be ignored

Applying these guidelines allows the determination of the unknown valance state of ions in most minerals:

Example: What is the charge on Mn in rhodonite, $MnSiO_3$?

Solution: Oxygen is -2, so three oxygens are -6
Silicon is +4, so $SiO_3$ is -2
Therefore, Mn is +2

Apply the guidelines to solve the unknown valance state of the minerals on the back side of this sheet.

| **Mineral or group** | **Formula** | **Ion** | **Charge on ion** (List sign and numerical charge) |
|---|---|---|---|
| 1. Stibnite | $Fe_2O_3$ | Fe | +3 |
| 2. Aragonite | $CaCO_3$ | Ca | +2 |
| 3. Vanadanite group | $VO_4^{-3}$ | V | +5 |
| 4,Tungstate group | $WO_4^{2-}$ | W | +6 |
| 5. Chromate group | $CrO_4^{-2}$ | Cr | +6 |
| 6. Spinel | $MgAl_2O_4$ | Mg | +2 |
| 7.Manganite | MnO(OH) | Mn | +3 |
| 8. Azurite | $Cu_3(CO_3)_2(OH)_2$ | Cu | +2 |
| 9. Celestite | $SrSO_4$ | Sr | +2 |
| 10. Spessartine | $Mn_3Al_2Si_3O_{12}$ | Mn | +2 |