

48. Name each of the following binary compounds:

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|---------------------------|--------------------|
| a. MgI_2 | e. SO_2 |
| b. NaF | f. PBr_3 |
| c. CS_2 | g. CaCl_2 |
| d. N_2O_4 | h. AgI |

49. Assign oxidation numbers to each atom in the following molecules and ions:

- | | |
|--------------------------------|------------------------------|
| a. CO_2 | e. H_2O_2 |
| b. NH_4^+ | f. P_4O_{10} |
| c. MnO_4^- | g. OF_2 |
| d. $\text{S}_2\text{O}_3^{2-}$ | |

50. A 175.0 g sample of a compound contains 56.15 g C, 9.43 g H, 74.81 g O, 13.11 g N, and 21.49 g Na. What is the compound's empirical formula?

CRITICAL THINKING

51. Analyzing Information Sulfur trioxide is produced in the atmosphere through a reaction of sulfur dioxide and oxygen. Sulfur dioxide is a primary air pollutant. Analyze the formula for sulfur trioxide. Then, list all of the chemical information from the analysis that you can.

52. Analyzing Data In the laboratory, a sample of pure nickel was placed in a clean, dry, weighed crucible. The crucible was heated so that the nickel would react with the oxygen in the air. After the reaction appeared complete, the crucible was allowed to cool and the mass was determined. The crucible was reheated and allowed to cool. Its mass was then determined again to be certain that the reaction was complete. The following data were collected:

Mass of crucible	= 30.02 g
Mass of nickel and crucible	= 31.07 g
Mass of nickel oxide and crucible	= 31.36 g

Determine the following information based on the data given above:

Mass of nickel	=
Mass of nickel oxide	=
Mass of oxygen	=

Based on your calculations, what is the empirical formula for the nickel oxide?



USING THE HANDBOOK

53. Review the common reactions of Group 1 metals in the *Elements Handbook*, and answer the following questions:

- Some of the Group 1 metals react with oxygen to form superoxides. Write the formulas for these compounds.
- What is the charge on each cation for the formulas that you wrote in (a)?
- How does the charge on the anion vary for oxides, peroxides, and superoxides?

54. Review the common reactions of Group 2 metals in the *Elements Handbook*, and answer the following questions:

- Some of the Group 2 metals react with oxygen to form oxides. Write the formulas for these compounds.
- Some of the Group 2 metals react with oxygen to form peroxides. Write the formulas for these compounds.
- Some of the Group 2 metals react with nitrogen to form nitrides. Write the formulas for these compounds.
- Most Group 2 elements form hydrides. What is hydrogen's oxidation state in these compounds?

55. Review the analytical tests for transition metals in the *Elements Handbook*, and answer the following questions:

- Determine the oxidation state of each metal in the precipitates shown for cadmium, zinc, and lead.
- Determine the oxidation state of each metal in the complex ions shown for iron, manganese, and cobalt.
- The copper compound shown is called a *coordination compound*. The ammonia shown in the formula exists as molecules that do not have a charge. Determine copper's oxidation state in this compound.