

93. Magnesium forms both an oxide and a nitride when burned in air. Discuss the formation of magnesium oxide and magnesium nitride when magnesium atoms react with oxygen and nitrogen atoms.

A Mg atom loses two valence electrons, forming Mg^{2+} . An O atom gains two electrons, forming O^{2-} . One magnesium ion attracts one oxygen ion, forming MgO. Three Mg atoms each lose two electrons, forming Mg^{2+} , while two N atoms each gain three electrons, forming two N^{3-} . The ions attract each other, forming Mg_3N_2 .

94. An external force easily deforms sodium metal, while sodium chloride shatters when the same amount of force is applied. Why do these two solids behave so differently?

Sodium metal contains metallic bonds. Sodium chloride is an ionic solid.

95. Name each of the following ionic compounds.

a. CaO

calcium oxide

b. BaS

barium sulfide

c. $AlPO_4$

aluminum phosphate

d. $Ba(OH)_2$

barium hydroxide

e. $Sr(NO_3)_2$

strontium nitrate

96. Write the formulas for all of the ionic compounds that can be formed by combining each of the cations with each of the anions listed below. Name each compound formed.

Table 8-11

Cations	Anions
Ba^{2+}	$S_2O_3^{2-}$
Cu^+	Br^-
Al^{3+}	NO_2^-

BaS_2O_3 , barium thiosulfate; $BaBr_2$, barium bromide; $Ba(NO_2)_2$, barium nitrite; $Cu_2S_2O_3$, copper(I) thiosulfate; $CuBr$, copper(I) bromide; $CuNO_2$, copper(I) nitrite; $Al_2(S_2O_3)_3$, aluminum thiosulfate; $AlBr_3$, aluminum bromide; $Al(NO_2)_3$, aluminum nitrite

Thinking Critically

97. **Concept Mapping** Design a concept map to explain the physical properties of both ionic compounds and metallic solids.

Concept maps will vary.

98. **Predicting** Predict which solid in each of the following will have the higher melting point. Explain your answer.

a. NaCl or CsCl

NaCl; smaller ion size

b. Ag or Cu

Cu; it is smaller.

c. Na_2O or MgO

MgO; Mg has a greater charge.

99. **Comparing and Contrasting** Compare and contrast cations and anions.

Cations are formed from the loss of electrons and have a positive charge. Anions are formed from the gain of electrons and have a negative charge.

100. **Observing and Inferring** From the following incorrect formulas and formula names, identify the mistakes and design a flow chart to prevent the mistakes.

Flow charts will vary.

a. copper acetate

Identify the metal as copper(II) or copper(I).

b. Mg_2O_2

The formula unit is not in the simplest ratio.

c. Pb_2O_5

Lead can have only the oxidation state of 2+ or 4+, not 5+.