

Percentage Composition: Chap. 7, Sec. 3

132. Determine the percentage composition of each of the following compounds.
- sodium oxalate, $\text{Na}_2\text{C}_2\text{O}_4$
 - ethanol, $\text{C}_2\text{H}_5\text{OH}$
 - aluminum oxide, Al_2O_3
 - potassium sulfate, K_2SO_4
133. Suppose that a laboratory analysis of white powder showed 42.59% Na, 12.02% C, and 44.99% oxygen. Would you report that the compound is sodium oxalate or sodium carbonate? (Use 43.38% Na, 11.33% C, and 45.29% O for sodium carbonate, and 34.31% Na, 17.93% C, and 47.76% O for sodium oxalate.)
134. Calculate the mass of the given element in each of the following compounds.
- bromine in 50.0 g potassium bromide, KBr
 - chromium in 1.00 kg sodium dichromate, $\text{Na}_2\text{Cr}_2\text{O}_7$
 - nitrogen in 85.0 mg of the amino acid lysine, $\text{C}_6\text{H}_{14}\text{N}_2\text{O}_2$
 - cobalt in 2.84 g cobalt(II) acetate, $\text{Co}(\text{C}_2\text{H}_3\text{O}_2)_2$

Hydrates

135. Calculate the percentage of water in each of the following hydrates.
- sodium carbonate decahydrate, $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
 - nickel(II) iodide hexahydrate, $\text{NiI}_2 \cdot 6\text{H}_2\text{O}$
 - ammonium hexacyanoferrate(III) trihydrate (commonly called ammonium ferricyanide), $(\text{NH}_4)_2\text{Fe}(\text{CN})_6 \cdot 3\text{H}_2\text{O}$
 - aluminum bromide hexahydrate

Mixed Review

136. Write formulas for the following compounds and determine the percentage composition of each.
- nitric acid
 - ammonia
 - mercury(II) sulfate
 - antimony(V) fluoride
137. Calculate the percentage composition of the following compounds.
- lithium bromide, LiBr
 - anthracene, $\text{C}_{14}\text{H}_{10}$
 - ammonium nitrate, NH_4NO_3
 - nitrous acid, HNO_2
 - silver sulfide, Ag_2S
 - iron(II) thiocyanate, $\text{Fe}(\text{SCN})_2$
 - lithium acetate
 - nickel(II) formate
138. Calculate the percentage of the given element in each of the following compounds.
- nitrogen in urea, NH_2CONH_2
 - sulfur in sulfuryl chloride, SO_2Cl_2
 - thallium in thallium(III) oxide, Tl_2O_3
 - oxygen in potassium chlorate, KClO_3
 - bromine in calcium bromide, CaBr_2
 - tin in tin(IV) oxide, SnO_2
139. Calculate the mass of the given element in each of the following quantities.

- oxygen in 4.00 g of manganese dioxide, MnO_2
 - aluminum in 50.0 metric tons of aluminum oxide, Al_2O_3
 - silver in 325 g silver cyanide, AgCN
 - gold in 0.780 g of gold(III) selenide, Au_2Se_3
 - selenium in 683 g sodium selenite, Na_2SeO_3
 - chlorine in 5.0×10^4 g of 1,1-dichloropropane, $\text{CHCl}_2\text{CH}_2\text{CH}_3$
140. Calculate the percentage of water in each of the following hydrates.
- strontium chloride hexahydrate, $\text{SrCl}_2 \cdot 6\text{H}_2\text{O}$
 - zinc sulfate heptahydrate, $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$
 - calcium fluorophosphate dihydrate, $\text{CaFPO}_3 \cdot 2\text{H}_2\text{O}$
 - beryllium nitrate trihydrate, $\text{Be}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$
141. Calculate the percentage of the given element in each of the following hydrates. You must first determine the formulas of the hydrates.
- nickel in nickel(II) acetate tetrahydrate
 - chromium in sodium chromate tetrahydrate
 - cerium in cerium(IV) sulfate tetrahydrate
142. Cinnabar is a mineral that is mined in order to produce mercury. Cinnabar is mercury(II) sulfide, HgS . What mass of mercury can be obtained from 50.0 kg of cinnabar?
143. The minerals malachite, $\text{Cu}_2(\text{OH})_2\text{CO}_3$, and chalcopyrite, CuFeS_2 , can be mined to obtain copper metal. How much copper could be obtained from 1.00×10^3 kg of each? Which of the two has the greater copper content?
144. Calculate the percentage of the given element in each of the following hydrates.
- vanadium in vanadium oxysulfate dihydrate, $\text{VOSO}_4 \cdot 2\text{H}_2\text{O}$
 - tin in potassium stannate trihydrate, $\text{K}_2\text{SnO}_3 \cdot 3\text{H}_2\text{O}$
 - chlorine in calcium chlorate dihydrate, $\text{CaClO}_3 \cdot 2\text{H}_2\text{O}$
145. Heating copper sulfate pentahydrate will evaporate the water from the crystals, leaving anhydrous copper sulfate, a white powder. *Anhydrous* means “without water.” What mass of anhydrous CuSO_4 would be produced by heating 500.0 g of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$?
146. Silver metal may be precipitated from a solution of silver nitrate by placing a copper strip into the solution. What mass of AgNO_3 would you dissolve in water in order to get 1.00 g of silver?
147. A sample of Ag_2S has a mass of 62.4 g. What mass of each element could be obtained by decomposing this sample?
148. A quantity of epsom salts, magnesium sulfate heptahydrate, $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, is heated until all the water is driven off. The sample loses 11.8 g in the process. What was the mass of the original sample?
149. The process of manufacturing sulfuric acid begins with the burning of sulfur. What mass of sulfur would have to be burned in order to produce 1.00 kg of H_2SO_4 ? Assume that all of the sulfur ends up in the sulfuric acid.