

Problem Set 1

Reading for Today's Lecture

Introduction to Chemical Principles Chapter 4.3 – 4.4

Reading for Thursday's Lecture

Introduction to Chemical Principles Chapter 2.1 – 2.4

Practice Problems

Chapter 4: 7, 8, 9, 10, 11, 12, 15, 16.

Additional Problems

1. Suppose you have two different samples. Each is a white powder and each powder is found to melt at 221°C and each has a measured density of 1.23 g/mL. Can you conclude the two powders are the same substance? Explain.
2. *The Merck Index* contains the following description of Copper:

Reddish, lustrous, ductile, malleable metal; face-centered cubic structure; commercially available in the form of ingots, sheets, wire or powder. Becomes dull when exposed to air. In moist air gradually becomes coated with green basic carbonate. d 8.94. mp 1083°. bp 2595°. Mohs' hardness 3.0. Resistivity 1.673 microhm-cm. Heat of fusion 48.9 cal/g; heat of vaporization 1150 cal/g. Heat capacity at constant pressure (solid) 0.092 cal/g/°C (20°), (liq) 0.112 cal/g/°C. E^0 (aq) Cu^+/Cu +0.521 V; E^0 (aq) Cu^{2+}/Cu +0.337 V. Very slowly attacked by cold hydrochloric or dil sulfuric acid; readily by dil nitric acid, and by both hot concd H_2SO_4 and HBr . It is also attacked by acetic and other organic acids. Slowly sol in ammonia water.

Identify the chemical and the physical properties mentioned. If there are properties that you are not familiar with, and there are probably a number of them, list them as “I have no idea what this is!”.

3. You have a sample of a metallic solid that has the following properties:

Color:	Silvery
Density:	8.7 g/cm ³
Melting Pt:	321°C

You suspect this to be Aluminum, Chromium or Cadmium. Consult appropriate literature sources (*Wikipedia* is acceptable) to determine which metal this is.

4. Use a *CRC Handbook of Chemistry and Physics* to determine the solubility of Hypo Phosphorus Acid in Cold Water and Hot Water. According to this handbook, what other solvents is this substance soluble in?
5. Identify three substances found in your home/dorm room and for each list three chemical and three physical properties
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