

AP Problem Set #4

Name _____
Period _____

The Carbonate ion is formed when carbon dioxide reacts with slightly basic cold water.

- (A) Draw the lewis electron dot structure for the carbonate ion. Include resonance structures when they are appropriate.
- (B) Describe the hybridization of carbon in the carbonate ion.
- (C) Describe the relative lengths of the three C-O bonds in the carbonate ion.
- (D) Compare the average length of the C-O bonds in the carbonate ion to the average lengths of the C-O bonds in carbon dioxide.

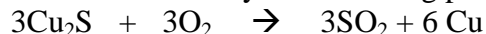
Use the principles of bonding and molecular structure to explain the following statements.

- (A) The angles between the N-F bonds in NF_3 is smaller than the angle between the B-F bonds in BF_3
- (B) I_2 (s) is insoluble in water but is soluble in carbon tetrachloride.
- (C) Diamond is one of the hardest substances on Earth

The table below shows three commons forms of copper ore.

		Percent by weight		
		Copper	Sulfur	Iron
1	Cu_2S	?	?	0
2	?	34.6	34.9	30.5
3	?	55.6	28.1	16.3

- (A) What is the percent by weight of Cu_2S ?
- (B) What is the empirical formula of ore #2
- (C) If a sample of ore #3 contains 11.0 g of iron, how many grams of sulfur does it contain?
- (D) Cu can be extracted from Cu_2S by the following process:



If 3.84 g of O_2 are consumed in the process, how many grams of Cu are produced?

Lab Procedures 1984

Given solid samples of KI and of $(\text{NH}_4)_2\text{CO}_3$, briefly describe four simple laboratory test by which these two compounds can be distinguished. For each test report the expected result for each compound.

Gases 1982D

- (A) From the standpoint of the kinetic-molecular theory, discuss briefly the properties of gas molecules that cause deviations from the ideal behavior.
- (B) At 25°C and 1atm pressure, which of the following gases shows the greatest deviation from the ideal behavior? Give two reasons for your choice.
- CH₄ SO₂ O₂ H₂
- (C) Real gases approach ideality at low pressure, high temp or both. Explain these observations.