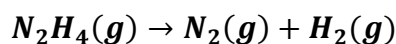
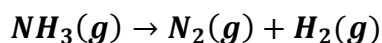


General Chemistry I

PLI #17

June 29, 2021

1. A particular balloon is designed by its manufacturer to be inflated to a volume of no more than 2.50 L. If the balloon is filled with 2.00 L helium at sea level, is released, and rises to an altitude at which the atmospheric pressure is only 500. mm Hg, will the balloon burst?
2. A mixture of $\text{NH}_3(\text{g})$ and $\text{N}_2\text{H}_4(\text{g})$ is placed in a sealed container at 300 K. The total pressure is 0.50 atm. The container is heated to 1200 K at which time both substances decompose completely according to the following unbalanced equations:



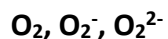
After decomposition is complete, the total pressure at 1200 K is found to be 4.5 atm. Find the percent of $\text{N}_2\text{H}_4(\text{g})$ in the original mixture. Assume two significant figures for the temperature.

3. 5.00 g of solid calcium carbonate reacts with 100.0 mL of 0.200 M hydrochloric acid, represented by the following unbalanced equation.



What volume of carbon dioxide gas is produced at a pressure of 750.0 mm Hg and a temperature of 22.0°C?

4. Using the molecular orbital model, describe the bonding, magnetism, and relative bond orders in the following species:



5. A quantity of N_2 gas originally held at 5.25 atm pressure in a 1.00-L container at 26°C is transferred to a 12.5-L container at 20°C . A quantity of O_2 gas originally at 5.25 atm and 26°C in a 5.00-L container is transferred to this same container. What is the total pressure in the new container?
6. 6.3 mg of a boron hydride is contained in a flask of 385 mL at 25.0°C and a pressure of 11 torr.
- Determine the molar mass of the hydride. (1 atm is equal to 760 torr)
 - Which of the following hydrides is contained in the flask, BH_3 , B_2H_6 , or B_4H_{10} ?
7. Draw a likely spatial orientation of a single water molecule with a single molecule of NaCl