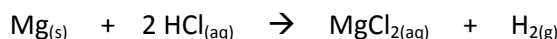


1. Magnesium metal will react with acid to release Hydrogen gas as in the following equation:



- If 0.8712g Mg are reacted with ample HCl, how many grams of H₂ will be released?
 - At STP, how many Liters will the H₂ from part A occupy?
 - H₂ will combust with O₂ as follows: $\text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}$
At STP, how many liters of O_{2(g)} would be required to react with the H₂ from part A?
2. A sealed 4.0 L container contains both H₂ gas and N₂ gas, with p_{H₂} = 4.5 atm and p_{N₂} = 1.5 atm. The temperature is 25.0 °C and no other gases are present.
- If a spark is applied, the gases will react to form gaseous ammonia, NH₃. Will the total pressure inside the container go up, go down or remain unchanged as a result of the reaction, assuming constant temperature? Explain. (Hint: write the balanced equation)
 - Determine the partial pressure of NH₃ gas after the reaction is complete.
 - Based on the balanced equation for this reaction, determine how the following changes would affect the direction of the equilibrium. Reaction is endothermic.
 - Increase pressure
 - Decrease pressure
 - Suddenly Increase temperature
 - Decrease [N₂]
 - Increase [H₂]
 - Decrease [NH₃]

3. Use the following equilibrium expressions to write a chemical equation for each

a. $K = \frac{[AB_2]^2}{[A_2][B_2]^2}$

b. $K = \frac{[A_2B_3]}{[A]^2[B]^3}$

4. A balloon is filled with helium at sea level. Describe what would happen to the balloon in each of the following scenarios (assume the balloon will never pop):
- The balloon floats to a higher altitude
 - The balloon is placed in Liquid Nitrogen (-196°C)
 - The balloon is placed in a hyperbaric chamber which has a pressure of 2.5 atm.
 - The balloon is heated in a microwave
 - The balloon rides with you as you drive over a mountain range and back to sea level.

5. Fill in the missing variable:

	P ₁	V ₁	T ₁	P ₂	V ₂	T ₂
a	0.550 atm	1.1 L	265 K	?	3.501 L	0.0° C
b	880. torr	1250 mL	5.04°C	1.1 atm	?	298 K
c	200. mm Hg	3.8 * 10 ¹⁰ nL	-120°C	100. torr	0.44 L	?

6. How many moles of gas would be in samples 5a, 5b, and 5c.