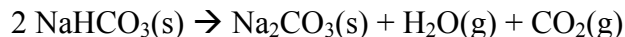


CH302H – Principles of Chemistry II: Honors
Fall 2016, Unique 49420

Homework, Week 3

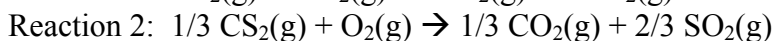
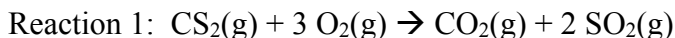
1. Most of the portable red fire extinguishers that you see in public buildings or can purchase for your home (the so-called “ABC dry chemical” extinguishers) contain powdered sodium bicarbonate that decomposes when exposed to high temperature (for example from a fire) into sodium carbonate, water, and carbon dioxide:



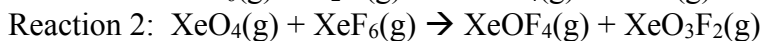
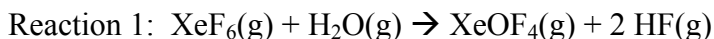
a) Determine the equilibrium constant of the reaction at 150°C.

b) At equilibrium, if the partial pressure of $\text{CO}_2(\text{g})$ is 0.80 atm, what is the partial pressure of $\text{H}_2\text{O}(\text{g})$?

2. How do the equilibrium constants for the following two reactions compare at 25°C:



3. Determine the equilibrium constant for reaction 3 (K_3) in terms of the equilibrium constants for reactions 1 and 2 (K_1 and K_2):



4. Phosphorous pentachloride (PCl_5) decomposes into phosphorous trichloride (PCl_3) and chlorine gas. 1.5 g of PCl_5 is placed into a 10 mL sealed vessel and heated to 250°C, (which is above its sublimation temperature). Determine the partial pressure of all species at equilibrium.