

Friday Worksheet

Name:

Ammonia worksheet 4

1) Nitrogen and hydrogen gases were mixed in a reaction vessel within a bomb calorimeter and allowed to form ammonia gas. A volume of 100.0 mL of water in the calorimeter at 25.0 °C was heated to 33.1 °C. If 70.0 % of the energy released by the reaction goes into heating up the water and 1.70 grams of ammonia formed write a balanced thermochemical equation for the reaction between hydrogen and nitrogen gases to form ammonia gas.

2) In an experiment, a mixture of H₂, N₂ and NH₃ was placed in a sealed reaction vessel and allowed to reach equilibrium at a temperature of 470°C. The concentrations of gases at equilibrium were analysed and found to contain 0.121M H₂, 0.0400M N₂ and 0.00272M NH₃. Calculate the equilibrium constant at this temperature

a) Write the equilibrium expression for this reaction.

b) Calculate the equilibrium constant at 470 °C.

3) In one experiment, 0.015 mol of H₂(g) and 0.010 mol of N₂(g) are combined in a 2.00 L vessel at 470°C. The mixture is allowed to come to equilibrium and the concentration of NH₃(g) is observed to be 3.20 x 10⁻³M. Calculate the equilibrium concentration of H₂(g) at this temperature.