Answer on Question #76334 - Chemistry - Physical Chemistry

Question:

Hydrogen iodide undergoes decomposition according to the equation

$2HI(g) \rightleftharpoons H2(g) + I2(g)$

The equilibrium constant at 425 oC for this system is 0.018. If 1.0 mol of each of H2, I2, and HI were placed in a 1.0 L container at 425 oC, then

A) the concentration of HI would decrease.

B) the value of K would increase to 1.0.

C) because of reaction, the total number of molecules would decrease.

D) because of reaction, the total number of molecules would increase.

E) the concentration of H2 would decrease.

Solution:

Since the quantities of reagents and products are provided, but not necessarily in equilibrium, this is good possibility to use factor, M. Remember that the expression for the quotient is identical to the expression the equilibrium constant, but the values that can be introduced into the factor can be at any point of the reaction. Set and then include concentrations, not moles:

$M = [HI]^2/([H_2] * [I_2]) = [1]^2/ 1*1;$

Now compare this value with the equilibrium constant. Since M> K, there are currently too many products, so

the reaction will proceed in the opposite direction.

Answer B does not make sense, because the value of K does not change if the temperature does not change.

Neither C nor D answer is meaningful, since if the reaction goes to the right, this means that each of the two molecules

HI, which will react, one molecule of hydrogen and one molecule of iodine will be created, and vice versa

reaction goes to the left. This means that this reaction will maintain the number of complete molecules, regardless of

direction of shear.

Answer A assumes that the reaction is directed in the forward direction, which has just been shown differently. And

Finally, the answer E assumes that the reaction is directed in the opposite direction, which is.

Answer: E) the concentration of H_2 would decrease.