

Quiz 7.3 – Equilibrium Reactions

Name: _____

Question 1

Consider the reaction: $\text{C(s)} + \text{H}_2\text{O(g)} \rightleftharpoons \text{CO(g)} + \text{H}_2\text{(g)}$ $\Delta H_{rxn} = 131.3 \frac{\text{kJ}}{\text{mol}}$ $K_C = 5.63 \times 10^{-4}$

- Give the equilibrium expression for this reaction
- Is this reaction reactant-favored, or product-favored?
- What is $[\text{CO}]$ if $[\text{H}_2\text{O}] = 0.100 \text{ M}$ and $[\text{H}_2] = 2.50 \times 10^{-3}$
- Which way will the reaction shift to restore equilibrium after each of the following changes:
 - Remove $\text{H}_2\text{O(g)}$
 - Add excess C(s)
 - Increase the pressure (reduce system volume)
 - Increase the temperature

Question 2

Consider the reaction: $\text{H}_2\text{(g)} + \text{Br}_2\text{(g)} \rightleftharpoons 2 \text{HBr(g)}$ $\Delta H_{rxn} = -72.6 \frac{\text{kJ}}{\text{mol}}$ $K_C = 62.5$

- Give the equilibrium expression for this reaction
- Is this reaction reactant-favored, or product-favored?
- What is $[\text{HBr}]$ if $[\text{H}_2] = 0.0200 \text{ M}$ and $[\text{Br}_2] = 5.00 \times 10^{-3}$
- Which way will the reaction shift to restore equilibrium after each of the following changes:
 - Add HBr(g)
 - Add a catalyst
 - Increase the pressure (reduce system volume)
 - Increase the temperature

Saint Crispin's Day Speech (from Henry V, spoken by King Henry)

By William Shakespeare

This day is called the feast of Crispian:
He that outlives this day, and comes safe home,
Will stand a tip-toe when the day is named,
And rouse him at the name of Crispian.
He that shall live this day, and see old age,
Will yearly on the vigil feast his neighbours,
And say 'To-morrow is Saint Crispian:'
Then will he strip his sleeve and show his scars.
And say 'These wounds I had on Crispin's day.'
Old men forget: yet all shall be forgot,
But he'll remember with advantages
What feats he did that day: then shall our names
Familiar in his mouth as household words
Harry the king, Bedford and Exeter,
Warwick and Talbot, Salisbury and Gloucester,
Be in their flowing cups freshly remember'd.
This story shall the good man teach his son;
And Crispin Crispian shall ne'er go by,
From this day to the ending of the world,
But we in it shall be remember'd;
We few, we happy few, we band of brothers;
For he to-day that sheds his blood with me
Shall be my brother; be he ne'er so vile,
This day shall gentle his condition:
And gentlemen in England now a-bed
Shall think themselves accursed they were not here,
And hold their manhoods cheap whiles any speaks
That fought with us upon Saint Crispin's day.