Lab-report # 5

Date: 97-11-14 Time: 12.50-14.20

Chemical equlilbria:

Work to be done:

- By experiments find out how chemical equilibria works.

Chemicals and apparatus:

- Two beakers
- Five test-tubes
- Kaliumtiocyanat, KSCN
- 0.002M Kaliumtiocyanatsolution, KSCN + H_2O
- Dinatriumfosfat, Na_2HPO_4
- 0.002M Iron(III)nitratesolution, $FeNO_3$
- 0.2M Silvernitratesolution, $AgNO_3$

Lab:

Lab 1

One test-tubes is filled half of distilled water (A) and another with kaliumtiocyanatsolution (B). Both solutions are colorless. Solution (B) contains SCN^-. I add five drops of iron(III)nitratesolution to both test-tubes and the kaliumtiocyanatsolution turns dark-red. The explanation is that there has been a reaction in solution (B), $Fe^{3+} + SCN^- \rightarrow FeSCN^{2+}$, where $FeSCN^{2+}$ has a dark-red color.

Lab 2

The solution in test-tube (B) is placed in five other test-tubes. I will now perform four different experiment and then compare with the original solution, and therefor I label the test-tubes a, b, c, d and e.

In test-tube (a) I add some KSCN (cristals) and therefor raise the concentration of SCN^- in the solution. The visible change is that the solution turn darker red. And since $FeSCN^{2+}$ is red, the conclusion is that the solution contains more $FeSCN^{2+}$.

To test-tube (c) I add some FeNO3 and the concentration of Fe3+ is increased and the solution turns darker red → the concentration of FeSCN2+ is higher. Since no more SCN- has been added the ratio Fe3+ and SCN- must be in equilibrium. The solution now contains Fe3+, SCN-, FeSCN2+, NO3- and K+.

To test-tube (d) I add five drops of silvernitrate, $AgNO_3$, and the solution is turning brighter – the concentration of $FeSCN^{2+}$ must decrease. There seems to be a fight about the SCN^-ions, both Ag^+ and Fe^{3+} want them, but the Ag^+ions seems to win and form a salt, AgSCN, that is hard diluted in water. The effect is, as described earlier, that the concentration of $FeSCN^-$ has decreased and the color of the solution is lighter red. The reaction formula is $Fe^{3+} + SCN^- \rightarrow FeSCN^{2+}$, the reaction is to the left and the reaction is reversible.

In the last test-tube I add some dinatriumhydrofosphate, Na_2HPO_4, and the solution becomes colorless, there is no more $FeSCN^{2+}$. The concentration of Fe^{3+} has decreased. In the reaction $Fe^{3+} + SCN^- \rightarrow FeSCN^{2+}$, the reaction is to the left.

CONCLUTION:

In the reactions above I have changed the equilibrium by changing the concentration of different substances.