Kelsey Fruits

Dr. Jack Cnossen

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Lab 12

Memo: Lab 12- Oxidation-Reduction

The purpose of this lab is to be able to describe oxidation-reduction reactions, to determine relative strengths of oxidizing and reducing agents, and to understand electrochemical cells. For this lab there was four different parts/procedure that we needed to follow. For part one we had to place a strip of zinc in 5mL of copper(II) nitrate solution, and place a strip of copper in 5mL of zinc nitrate solution. Next was to place a strip of lead in 5mL of zinc nitrate solution, and a strip of zinc in 5mL of lead(II) nitrate solution. Lastly, we had to place a strip of lead in 5mL of copper(II) nitrate solution, and a strip of copper in 5mL in lead(II) nitrate. For part two the procedure was to pour one to two mL of FeCl3 solution into a test tube and record the color. We then had to dissolve a few crystals of SnCl2 in the solution and watch for the color change. On part three we had to dissolve 0.50 grams of FeSO4 in 25mL of water. Then had to pour 5mL of this solution in a large test tube, and add two drops of H2SO4. We then added a drop of KMnO4 into the solution and mixed it all together. We had to keep adding KMnO4 until we observed two color changes. Lastly for part four we had to add about 30mL of ZnSO4 solution to a 50mL beaker, and add 30mL of CuSO4 into a second 50mL beaker. We then had to have a strip of zinc and copper metal and place the copper in copper solution and the zinc in the zinc solution. We then had to connect the strips of metal to an electrical lead. We then soaked a piece of filter paper in potassium nitrate solution and made a bridge between the two solutions, with the tip of the filter paper in each solution. We then connected all of this to the voltmeter to measure the voltage of our cell.

What we observed in part one was first that the zinc went from silver to black color, and the copper metal had no change. In the next part the lead had no change and the zinc again turned black. Lastly, we observed that lead turned to a black color and the copper had no change. So out of these three metals zinc was oxidized the easiest, and lead was not. In part two we observed that the FeCl3 starting color was a dark yellow, and then after the crystals dissolved it turned into a lemon juice yellow color. This means that the reducing agent in this reaction is SnCl2. In part three we observed that the starting color of FeSO4 in water was a clear color. When we added H2SO4 it remained a clear color, but when we added KMnO4 it went to a brown color. When we mixed the solution around though the brown went back to being clear. We then kept adding drops of KMno4 until it permanently stayed a brownish purple. In this reaction the Fe was oxidized, and the Mn was reduced. Lastly, part four we observed that the voltage for our cell was 0.80 Volts.

All in all, I was able to tell that some metals are more readily, and easily available to be oxidized or reduced than other metals are. In part one I was able to tell that some metals will not react at all, but that other metals will react every time. It just depends on what the metal is and what solution you are reacting it with. In part two and three it showed the strengths of the oxidizing and reducing agents. In part two the strength was small, but in part three the strength of the agents was large. Lastly, in part four we were able to see that there is actually a charge within our cell we made.