Redox: Displacement of Metals

SCH4U_06 - 07

<u>The displacement of one metal by another from compounds</u>

Given: oxidation #

$$\overset{0}{Zn_{(s)}} + \overset{+2\ -2}{CuSO_{4(aq)}} \longrightarrow \overset{0}{Cu_{(s)}} + \overset{+2\ -2}{ZnSO_{4(aq)}}$$

One can see than the copper in solution is displaced by the zinc. The copper is reduced and the zinc is oxidized. We say that the more active zinc replaces the less active copper or that zinc is more easily oxidized than copper.

When comparisons between the ease of oxidation of several substances is compared and pooled the result is an activity series like the one on page _____ of the text. In this table, the substances at the bottom are more easily oxidized than those at the top so any given element is displaced from its compound by a metal below it in the table.

Assignment

1. What will happen if an iron nail is dipped into a solution of copper sulphate ($CuSO_4$)?

2. What will happen if a piece of copper is left in a solution of zinc nitrate overnight? Explain your answer?

3. Do the assignment questions on your unit outline notes as needed.

4. Use the Activity Series on page _____ of your text book to predict whether or not a reaction would occur if the following substances are put together.

   b) $CuSO_{4(aq)}$ and $Ag_{(s)}$

   b) $AgSO_{4(aq)}$ and $Zn_{(s)}$

   c) $Al_{(s)}$ and $MgSO_{4(aq)}$

   d) $CuSO_{4(aq)}$ and $Al_{(s)}$

   e) $AgSO_{4(aq)}$ and $Al_{(s)}$

   For each case where a reaction is predicted, write the balanced molecular equation.

5. List the metals A , B , C and D from the most easily oxidized to the least easily oxidized based on the information below.

   a) $C^+_{(aq)} + A_{(s)}$ -----> $C_{(s)} + A^+_{(aq)}$

   b) $B^+_{(aq)} + A_{(s)}$ -----> no reaction

   c) $B^+_{(aq)} + D_{(s)}$ -----> no reaction

   d) $A^+_{(aq)} + D_{(s)}$ -----> $A_{(s)} + D^+_{(aq)}$