

# How was Experiment 3 Graded?

Chem 151 Fall 2009

## III.A. Synthesis of an Aqueous Ferrofluid (20 pts. possible)

2 pts were awarded for each correct response in the questions.

- The color of  $\text{Fe}_3\text{O}_4$  is black, not brown. The brown ppt. formed in the beginning of the reaction is  $\text{Fe}_2\text{O}_3$ .  $\text{Fe}_3\text{O}_4$  is the ferrofluid particles that attracted by the magnetic, which are black.
- The synthesis reaction of ferrofluid (Eq. 7) is not a redox reaction because there are no changes in the oxidation number of Fe and other elements involved in the reaction.

4 pts were awarded for each correct reaction equation:



## III.B. The Silver Mirror (12 points possible)

The brown precipitate formed in Step 15 is silver hydroxide (  $\text{Ag}^+ + \text{OH}^- \rightarrow \text{AgOH}$  )

The reducing agent in Step 18 is glucose (or aldehyde group in glucose)

The color of Tollens reagent is colorless

The precipitate formed in Step 19 is AgCl

## III.C. The Reaction of Dioxovanadium (V) by Zinc Metal (28 points possible)

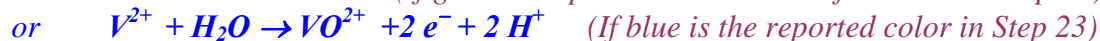
4 pts were awarded for a correct and balanced equation for the reaction of zinc and sulfuric acid.

2 pts were awarded for reporting the reaction is a redox reaction and  $\text{H}_2\text{SO}_4$  (or  $\text{H}^+$ ) is the oxidizing agent.

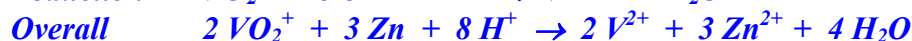
4 pts were awarded for reporting the correct oxidation state that corresponds to the color change of the solution. (*either +3, +4, or +5 are all acceptable as long as the O.N. agrees with the corresponding color changes and what had been recorded in the notebook.*)

2 pts. were awarded for identifying  $\text{V}^{2+}$  as the reducing agent in Step 23

4 pts were awarded for the correct half-reaction of  $\text{V}^{2+}$



4 pts were awarded for each correct and balanced equation for the reaction of  $\text{VO}_2^+$  with Zn metal to form  $\text{V}^{2+}$ .



## Complete Prelab Assignment and notebook pages (20 points possible)

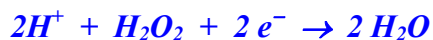
Two points were deducted for each of the following violations:

- Missing/Incorrect ChemID
- Using of pencil/red pen to write the report/notebook pages
- Using of white-outs in report/notebook pages
- Scribbling of errors in notebook pages

## Answers to Pre-lab Assignment

### Fill in the blanks:

1. When  $\text{H}_2\text{O}_2$  acts as an oxidizing agent, the oxygen atom ( loses ) electron(s) and forms the product(s)  $\text{H}_2\text{O}$  .
2. When  $\text{H}_2\text{O}_2$  acts as a reducing agent, the oxygen atom ( loses ) electron(s) and forms the product(s)  $\text{O}_2$  .
3. In the box below, write a balanced half-reaction equation showing  $\text{H}_2\text{O}_2$  acting as an oxidizing reagent in an acidic solution.



4. In the box below, write a balanced half-reaction equation showing zinc metal acting as a reducing reagent in an acidic solution.



5. Write a balanced half-reaction equation showing the reduction of dioxovanadium(V) to  $\text{VO}^{2+}$  in an acidic solution.



6. In the box below, write a balanced overall reaction equation showing dioxovanadium(V) reacts with zinc metal to produce  $\text{VO}^{2+}$  in an acidic solution.

