

Chapter 4. Reactions in Aqueous Solutions

We will spend three lecture days on this chapter and one review day. In this chapter we will learn to predict several fundamental chemical reactions. This chapter is so important that Exam 3 will cover only this chapter!

This is a chapter study guide, given section-by-section. Work problems on separate sheets of paper and keep them with this guide. *When working problems, use plenty of space and when appropriate, show all work.*

You will need to memorize the solubility rules. You will be given flashcards to cut out and start learning. Do this as soon as possible.

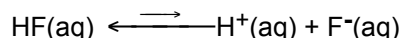
Section 4.1 Classify reactions as precipitation, acid-base neutralization, or redox.

Section 4.2 Classify substances as strong electrolytes, weak electrolytes, or nonelectrolytes.

For strong electrolytes, we use an arrow such as:



For weak electrolytes, we use the arrow:



Draw the ions/molecules present in a beaker. Our mantra this chapter is **"What's in the beaker?"**



Section 4.3 Write molecular, ionic, and net ionic equations for precipitation, acid-base, and redox reactions.

Do problem 1 - 4; 32, 34 (a only), 36, 38, (a - d and f), 40.

Section 4.4 Use solubility guidelines to determine whether a compound is likely to be soluble in water. You will be given Solubility Rules Flash Cards. Start memorizing them right away.

Use solubility guidelines to predict whether a precipitate might form when aqueous salt solutions are mixed.

Use solubility guidelines to predict the product of a precipitation reaction.

Show how a precipitation reaction can be used to prepare a substance.

Do problems 5 - 8; 44, 46(a-c), 48, 50, 52, 54; do problem 100.

Section 4.5 Identify the common strong acids and strong bases.

Do problems 9 - 12. Note for 9(b): "CH₃CO₂H" is actually acetic acid, HC₂H₃O₂]; 58, 60, 62, and 64.

Section 4.6 Assign oxidation numbers to each atom in a chemical species.



Professor Glickman, the lab practical joker, deftly places a single drop of hydrochloric acid on the back of Professor Bingham's neck.

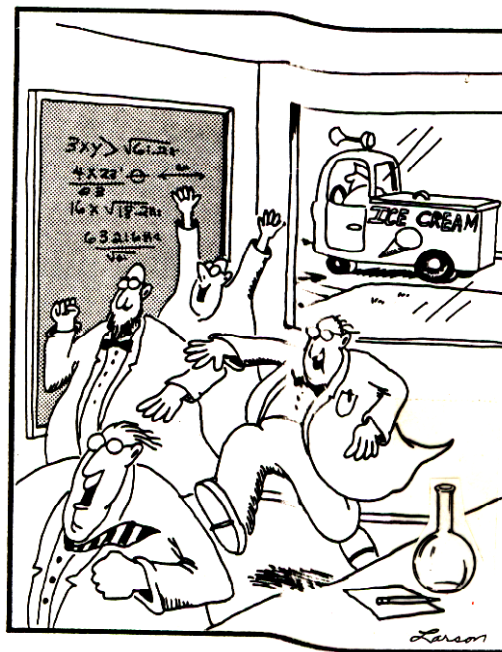
- Section 4.7** In a redox reaction, identify the species oxidized, the species reduced, the oxidizing agent, and the reducing agent.
- Do problems 13 – 15; 68, 70, 72, 74.

Skip Section 4.8

- Section 4.9** Balance redox reactions by the half-reaction method in acid.
- Do problems 19 and 20; 80, 82, 84, 86(a), 90(a-c)

- Section 4.10** Determine the concentration of a solution using data from a redox titration.
- Do problems 22, 92, 94, 96, 98, 100.

Read Section 4.12 Do problem 23



Advice from a former student:

I was definitely not one of the lucky students who came to college with a good chemistry background. The things that have helped me the most have been: (1) paying close attention in class and taking good notes, (2) doing all of the problem clubs and paying especially close attention to the things I had trouble with, (3) using all of your little word hints and such (LEO says GER), and (4) doing problems, reviews, etc. with other people to bounce questions off each other (most of the time if one person doesn't know the answer, someone else does)