**CHEMISTRY 2022-23 April 11, 2023**

**Today’s Agenda (Day 141)**

1. HOUSEKEEPING ITEMS

**🡪**  BRING:

1. Homework Check:

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1. Class Activity:

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🡪BEGIN: Chapter 19 PPT Review

1. **Section 19.1 – Oxidation and Reduction**
2. Section 19.2 – Balancing Redox

🡪FRIDAY: Launch Lab 18 & 19, ?Mini Lab 18, Chem Lab 17

HOMEWORK:

* READ: Chapter 19 – Redox Reactions
* COMPLETE:
* STUDY: Ch 19 Vocabulary Quiz and Test

CHAPTER 19 VOCABULARY

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| half-reaction | oxidation | oxidation-number method | oxidation-reduction reaction | oxidizing agent | redox reaction |
| reducing agent | reduction | species |  |  |  |

CHAPTER 20 VOCABULARY

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| anode | battery | cathode | corrosion | dry cell | electrochemical cell |
| electrolysis | electrolytic cell | fuel cell | galvanization | half-cell | primary battery |
| reduction potential | salt bridge | secondary battery | standard hydrogen electrode | voltaic cell |  |

REMINDERS:

* TEST: **Ch 19 🡪 April 13**
* QUIZ: **Ch 19 & 20 Vocabulary 🡪 April 18**
* TEST: **Ch 20 🡪 April 20**

**CHEMISTRY 2022-23 LAUNCH LAB**

**CHAPTER 18 LAUNCH LAB – What is in Your Cupboards?**

You can learn something about the properties of products in your household by testing them with strips of paper called litmus paper. Can you separate household products into two groups?



**Procedure **

1. Read and complete the lab safety form.

2. Place three or four drops of several **household products** into separate wells of a **microplate**. Draw a chart to show the position of each liquid.

3. Test each product with **red and blue litmus paper**. Place two drops of **phenolphthalein** in each sample. Record your observations.

**WARNING**: Phenolphthalein is flammable. Keep away from flames.

**Analysis**

1. Classify the products into two groups based on your observations.

2. Describe how the groups differ. What can you conclude?

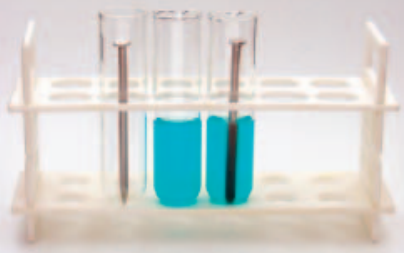
**Inquiry**

Choose one sample that reacted with the phenolphthalein. Can you reverse the reaction? Design an experiment to test your hypothesis**.**

**CHEMISTRY 2022-23 LAUNCH LAB**

**CHAPTER 19 LAUNCH LAB – What happens when iron and copper (II) sulfate react?**

Rust is the product of a reaction between iron and oxygen. Iron can also react with substances other than oxygen.



**Procedure **

1. Read and complete the lab safety form.

2. Use a piece of **steel wool** to polish the end of an iron nail.

3. Add about 3 mL of **1.0M copper (II) sulfate (CuSO4)** solution to a **test tube**. Place the polished end of the nail into the CuSO4 solution. Let the test tube stand in a **test-tube rack**, and observe it for about 10 min. Record your observations.

**Analysis**

1. Explain what happened to the color of the copper (II) sulfate solution.

2. Identify the substance clinging to the nail.

3. Write the balanced chemical equation for the reaction you observed.

**Inquiry**

What do you think would happen if copper was placed in an iron sulfate solution? Design an investigation to test your hypothesis.

**CHEMISTRY 2022-23 MINI LAB**

**CHAPTER 18 MINI LAB – Compare Acid Strengths**

How can you determine the relative strengths of acid solutions?

**Procedure **

1. Read and complete the lab safety form.

2. Use a **10-mL graduated cylinder** to measure 3 mL of **glacial acetic acid**. Use a **dropping pipette** to transfer the acid into Well A1 of a **24-well microplate**.

**WARNING**: Glacial acetic acid is corrosive and toxic by inhalation. Handle with caution.

3. Lower the electrodes of a **conductivity tester** into Well A1. Record your results.

4. Rinse the graduated cylinder and pipette with water. Measure 3 mL of **6.0M acetic acid** and transfer it to Well A2 of the microplate. Test and record the conductivity of the solution.

5. Repeat Step 4 **with 1.0M acetic acid** and **0.10M acetic acid** using wells A3 and A4, respectively.

**Analysis**

1. Write the equation for the ionization of acetic acid in water and the equilibrium constant expression (Keq = 1.8 × 1 0-5). What does the size of Keq indicate about the degree of ionization?

2. Explain whether the following approximate percent ionizations fit your laboratory results: glacial acetic acid, 0.1%; 6.0M acetic acid, 0.2%; 1.0M acetic acid, 0.4%; 0.1M acetic acid, 1.3%.

3. State a hypothesis that explains your observations using your answer to Question 2.

4. Utilize your hypothesis to draw a conclusion about the need to use large amounts of water for rinsing when acid spills on living tissue.

**CHEMISTRY 2022-23 MINI LAB**

**CHAPTER 19 MINI LAB – Observe a Redox Reaction**

How can tarnish be removed from silver?

**Procedure **

1. Read and complete the lab safety form.

2. Lightly buff a piece of **aluminum foil** with **steel wool** to remove any oxide coating.

3. Wrap a **small, tarnished object** in the aluminum foil, making sure that the tarnished area makes firm contact with the foil.

4. Place the wrapped object in a **400-mL beaker** and add a sufficient volume of **tap water** to cover it completely.

5. Add about 1 spoonful of **baking soda** and about 1 spoonful of **table salt** to the beaker.

6. Using **beaker tongs**, set the beaker and its contents on a **hot plate**, and heat until the water is almost boiling. Maintain the heat for approximately 15 min, until the tarnish disappears.

**Analysis**

1. Write the equation for the reaction of silver with hydrogen sulfide that yields silver sulfide and hydrogen.

2. Write the equation for the reaction of the tarnish (silver sulfide) with the aluminum foil that yields aluminum sulfide and silver.

3. Determine which metal, aluminum or silver, is more reactive. How do you know this from your results?

4. Explain why you should not use an aluminum pan to clean silver objects.

**CHEMISTRY 2022-23 PRACTICE PROBLEM**

**CHAPTER 19 – Redox Reaction**

**Practice Problems 19.1 –** Identify Oxidation-Reduction Reactions

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**Practice Problems 19.2 –** Determine Oxidation Numbers

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**Practice Problems 19.3 –** The Oxidation-Number Method

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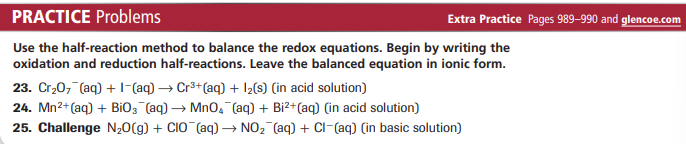
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**Practice Problems 19.4 –** Balance a Net Ionic Redox Equation

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**Problems 19.5 –** Balance a Redox Equation by Using Half-Reactions



**CHEMISTRY 2022-23 PROBLEM-SOLVING LAB**

**CHAPTER 19 Data Analysis Lab**

**How does redox lift a space shuttle?** The space shuttle gains nearly 72% of its lift from its solid rocket boosters (SRBs) during the first two minutes of launch. The two pencil-shaped SRB tanks are attached to both sides of the liquid hydrogen and oxygen fuel tank. Each SRB contains approximately 499,000 kg of propellent mixture.

As acids and bases enter the bloodstream as a result of normal activity, the blood’s buffer systems shift to effectively maintain a healthful pH.

**Data and Observations**

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**Think Critically**

1. Balance an equation Use the oxidation-number method to balance the chemical equation for the SRB reaction. NH4ClO4(s) + Al(s) → Al2O3(g) + HCl(g) + N2(g) + H2O(g)

2. State Which elements are reduced and which are oxidized?

3. Infer What are the benefits of using SRBs for the first two minutes of launch?

4. Calculate How many moles of water vapor are produced by one SRB?

**CHEMISTRY 2022-23 CHEM LAB 17**

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**CHEMISTRY 2022-23 CHEM LAB 19**

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