

# ELECTROCHEMISTRY

# THE OXIDATION NUMBER

- Oxidation Number Rules:
- The oxidation number of any pure element is 0.
- The oxidation number of a monatomic ion equals that charge on the ion.
- The more electronegative element in a binary compound is assigned the number equal to the charge it would have if it were an ion.
- The oxidation number of fluorine in a compound is always -1.
- Oxygen has an oxidation number of -2 unless it is combined with F, in which it is +1 or +2, or it is in peroxide (such as  $\text{H}_2\text{O}_2$  or  $\text{Na}_2\text{O}_2$ ), in which it is -1.
- Hydrogen is +1, unless combined with a metal, and then it is -1.
- In compounds, Group 1 is +1, Group 2 is +2, and Aluminum is +3.
- The sum of the oxidation numbers of all atoms in a neutral compound is 0.
- The sum of the oxidation numbers in a polyatomic ion equals the charge of the ion.

## ACTIVITY 1

- . S in  $\text{HSO}_4^-$  \_\_\_\_\_
- .
- Cl in  $\text{Fe}(\text{ClO}_2)_3$  \_\_\_\_\_
- .
- Fe in  $\text{Fe}(\text{ClO}_2)_3$  \_\_\_\_\_
- .
- N in  $\text{NO}_3^-$  **2**

## ACTIVITY 2

- $2 \text{Cr}^+ + \text{Sn}^{4+} \rightarrow 2 \text{Cr}^{3+} + \text{Sn}^{2+}$   
•
- **Oxidized:** \_\_\_\_\_ **Reduced:** \_\_\_\_\_
- 
- $3 \text{Hg}^{2+} + 2 \text{Fe} (\text{s}) \rightarrow 3 \text{Hg}_2 + 2 \text{Fe}^{3+}$   
•
- **Oxidized:** \_\_\_\_\_ **Reduced:** \_\_\_\_\_
- 
- $2 \text{As} (\text{s}) + 3 \text{Cl}_2 (\text{g}) \rightarrow 2 \text{AsCl}_3$   
•
- **Oxidized:** \_\_\_\_\_ **Reduced:** \_\_\_\_\_

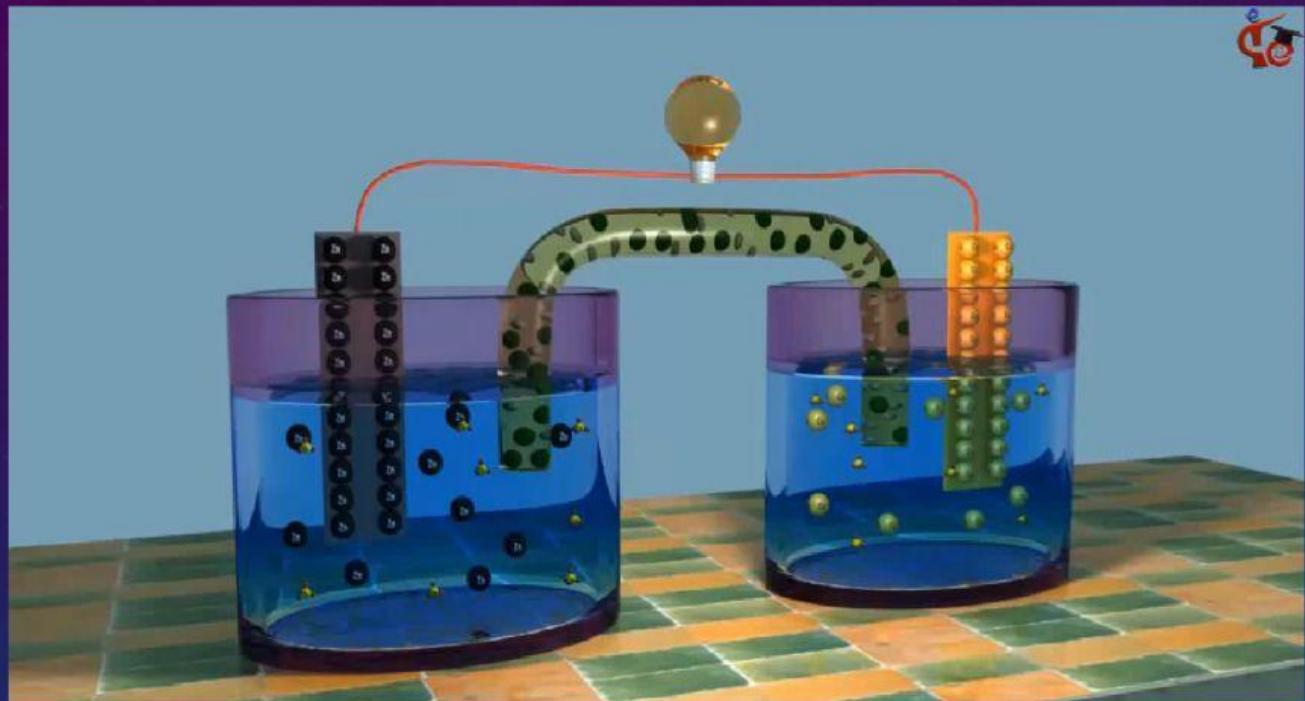
- study of the interchange between chemical change and electrical work
  - **Electrochemical cells:**
  - systems utilizing a redox reaction to produce or use electrical energy

**Voltaic (galvanic) cells:**

**a spontaneous reaction generates electrical energy**

**Electrolytic cells:**

**absorb free energy from an electrical source to drive a nonspontaneous reaction**



## ACTIVITY 3

- 1- what are the composition of the galvanic cell?
- 2- determine the anode , cathode and their charges?
- 3- what is the role of the salt bridge ?
- 4- Write the over all reaction of the galvanic cell?

# GALVANIC CELL VOLTAIC

