

**Practical work N°2:****Redox dosage –Manganimetry-****1-Reminder:**

- **Manganimetry:** Method of volumetric dosage of reducing bodies using a standard solution of potassium permanganate, generally in an acidic medium.
- A redox reaction is a reaction which involves a transfer of electrons from a reducer (Red1) of an Ox1/Red1 couple to the oxidant (Ox2) of another Ox2/Red2 couple.
- Oxidation is a loss of electrons.
- A reduction is a gain of electrons.

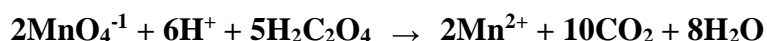
We summarize this as follows: **Reducer** → **Oxidant** + **ne<sup>-</sup>**

**2- Objective:**

Determination of the concentration and mass of oxalic acid.

**Principle of manipulation:**

The dosage consists of determining the concentration of a reducing solution knowing that of the oxidizing solution. We propose to study the oxidation of oxalic acid by the permanganate ion  $\text{MnO}_4^{-1}$  in an acidic medium.



This dosage is called manganimetry. The oxidizing properties of the permanganate ion are at the origin of manganimetry. The oxidizing form  $\text{MnO}_4^{-1}$  is purple, the reducing form  $\text{Mn}^{2+}$  is colorless, which allows the equivalent point to be determined without using colored indicators.

The  $\text{H}^+$  ions are provided by excess sulfuric acid (if the acid is not in sufficient quantity, the permanganate does not completely discolor and a brown color is observed).

This reaction is slow at the start, to activate, you can heat it slightly (not to exceed 60 °C) at the start of the dosage.

**3- Materials:**

Volumetric flask (100ml), Erlenmeyer, Pipette (20ml) or Test tube, Burette, Beaker, Funnel, Hot plate and stirring, Magnetic bar, Thermometer.

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**4- Products used:**

Oxalic acid solution  $\text{H}_2\text{C}_2\text{O}_4$  of unknown concentration, Potassium permanganate solution  $\text{KMnO}_4$  of normality 0.1N, Sulfuric acid solution  $\text{H}_2\text{SO}_4$ , Distilled water.

**5- Operating Mode:**

- Fill the burette with the  $\text{KMnO}_4$  oxidizing solution of 0.1N normality.
- You find a quantity of oxalic acid  $\text{H}_2\text{C}_2\text{O}_4$  in a 100ml vial. Complete with distilled water up to the mark, mix well.
- Take 20ml of  $\text{H}_2\text{C}_2\text{O}_4$  in an Erlenmeyer flask, add 10ml of  $\text{H}_2\text{SO}_4$  sulfuric acid.
- Heat the solution between 50 °C and 60 °C.
- Allow the oxidizing solution of  $\text{KMnO}_4$  to flow drop by drop with stirring until a pink color appears. Note the volume of  $\text{KMnO}_4$ .
- Repeat the operation 3 times to ensure results.