



Department of Anesthesia Techniques  
Title of the lecture:- Redox titration  
Asst. Lec. Hadeer Mohammed Subhi  
Asst. Lec. Lilyan Qassim Alwan  
Asst. Lec. Zainab Abbas Malik  
[hadeer.mohammed@uomus.edu.iq](mailto:hadeer.mohammed@uomus.edu.iq)  
[lilyan.qassim@uomus.edu.iq](mailto:lilyan.qassim@uomus.edu.iq)  
[Zainab.Abbas.malik@uomus.edu.iq](mailto:Zainab.Abbas.malik@uomus.edu.iq)



## Redox Titration

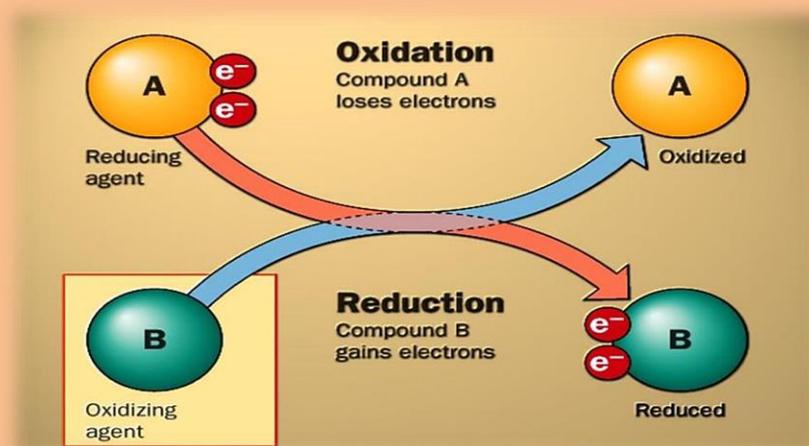
Redox Titration: is a titration which deals with a reaction involving oxidation and reduction of certain chemical species.

**Oxidation process:** involves loss of electrons.

**Reduction process:** involves gain of electrons.

**Oxidizing agent:** is one, which accepts electrons.

**Reducing agent:** is one, which loses the electrons.



Oxidation and reduction reactions always occur at the same time. One cannot take place in isolation from the other.

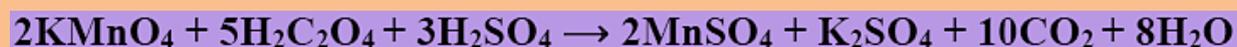


## Titration of Oxalic Acid with KMnO<sub>4</sub>

The titration of KMnO<sub>4</sub> vs Oxalic acid is a good example of the oxidation – reduction reaction.

KMnO<sub>4</sub> solution is considered a strong standard oxidizing agent and H<sub>2</sub>C<sub>2</sub>O<sub>4</sub> strong reducing agent.

The equation of oxidation reduction reaction is:



### Self – indicator:

If one of the reactants has some characteristic intense color, then **no** external indicator is added for the indication of completion of reaction.

For example, KMnO<sub>4</sub>, which has an intense violet color. As soon as the reaction complete, only one extra drop of KMnO<sub>4</sub> from burette is capable of changing the color of the solution.

### Glassware:

Burette – Stand – Conical flask – Funnel – Beaker – Pipette – Graduated Cylinder – Dropper – Washing bottle.

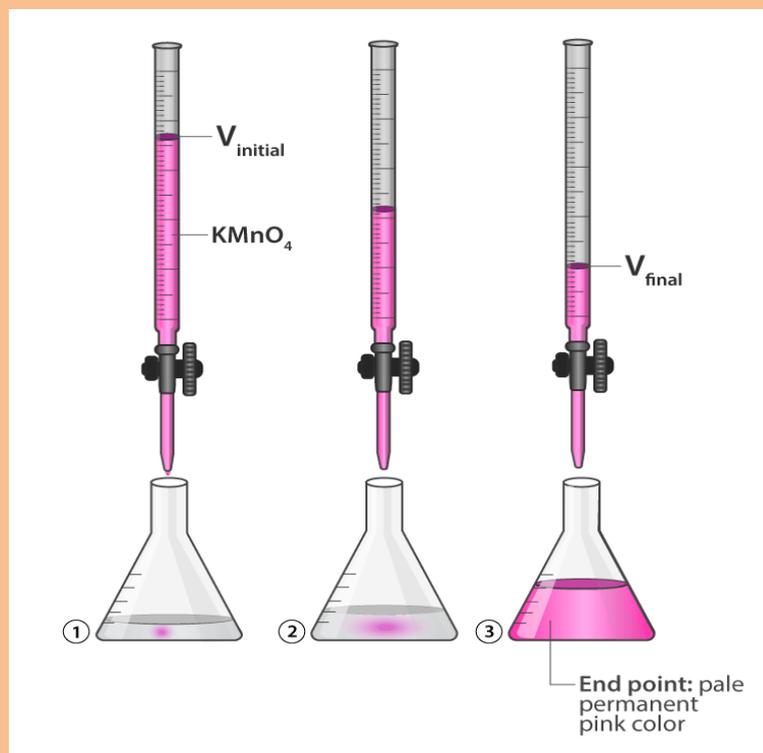
### Chemicals:

- 1- Potassium Permanganate (KMnO<sub>4</sub>) solution
- 2- Oxalic acid H<sub>2</sub>C<sub>2</sub>O<sub>4</sub> (0.1N)
- 3- Sulfuric acid H<sub>2</sub>SO<sub>4</sub> (2N) diluted
- 4- Distilled water D.W.



## Procedure:

1. Transfer by a pipette 5ml of oxalic acid (0.1N) solution in the conical flask or beaker.
2. Add 2ml of dil.  $H_2SO_4$  (2N).
3. Heat the reaction mixture to (60 – 70°C). (Do not boil).
4. Fill the burette with  $KMnO_4$  solution to zero mark.
5. Titrate the hot reaction mixture directly with potassium permanganate  $KMnO_4$  solution from the burette until the appearance of a pink color.
6. Repeat the titration for three times and record the results.



## Calculations:

