Spect. Deter. Of [Mn] in unknown sample & Calculation of ε

Introduction:

- **What is**:

  Mn?

  ε?

  $Mn_{\lambda max}$?

  Experiment's objective?

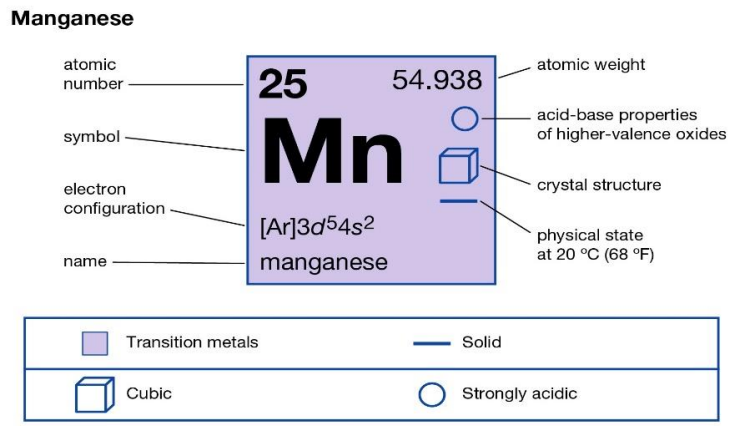
- **How to**:

  Convert colorless Mn compound to colored compound?

  Maintain colored Mn compound?

  Convert concentration unit from ppm to Molar and vice versa?

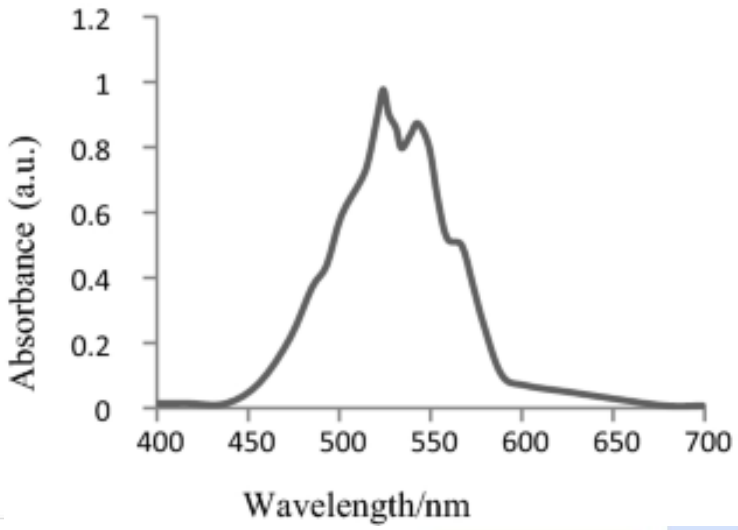
Mn:



ε:

ε is the molar absorptivity, also known as the extinction coefficient of the sample. It is a unique physical constant of the chemistry of the sample that relates to the sample's ability to absorb light at a given wavelength. Like path length (b) and sample concentration (c), ε is also directly proportional to Absorbance.

$Mn_{\lambda max}$:



Experiment's objective?

1-Finding [Mn] in the unlnown sample.

2- Calculating of ε Value.

Converting colorless Mn compound to colored compound:

$$2Mn^{2+} + 5IO_4^- + 9H_2O \leftrightarrow 2MnO_4^- + 5IO_3^- + 6H_2O$$

Maintaining colored Mn compound:

$$3MnO_4^{2-}{}_{(aq)} + 4H^+{}_{(aq)} ==> 2MnO_4^-{}_{(aq)} + MnO_{2(s)} + 2H_2O_{(l)}$$

Converting concentration unit from ppm to Molar and vice versa:

$$ppm = M \times MWt. \times 1000$$

Expermental:

1-Prepare 50ml Of [100ppm] (Mn^{7+}) from ($KMnO_4$) using tap water.

2-Prepare next (all in 50ml Volumetric flasks):

No	1	2	3	4	5	6	7
Flask						Blank	Unknown Sample
Mn^{7+}(ppm)	5	10	15	20	25	NIL	NIL

3-Prepare the Blank solution.

4-Move to the next Laboratory and follow the given instructions to find [C_{Mn}] & ε of the unknown sample.

Results:

No	$C_{(ppm)}$	Absorbance
Blank	nil	0
1	5	A_1
2	10	A_2
3	15	A_3
4	20	A_4
5	25	A_5
Unknown	?	?

Calibration Graph: