

# Determination of Chromium ion in given sample by UV-Visible Spectroscopy

## Experiment # 4

Nov 4, 2019

Determine the Amount per Litre of Cr(III) in a given sample by Spectroscopy

### Theory:

Spectroscopy is a technique that uses the absorbance of light by an analyte at a certain wavelength to determine the analyte concentration. UV-Visible spectroscopy uses light in UV and visible part of Electromagnetic spectrum.

According to Lambert Beer Law, the quantity of light absorbed by a substance dissolved in a fully transmitting solvent is directly proportional to the concentration of the substrate and path length of light through the solution.

$$A = E \times C \times l.$$

### Apparatus:

Beakers, UV-Visible Spectrophotometer.

### Chemicals:

$\text{CrCl}_3$

0.25% DMG

Distilled water.

### Procedure:

Stock solution of  $\text{CrCl}_3$  was prepared by dissolving 3g in 1L.

$$1000 \text{ ppm} \times \frac{52 + 106.5}{52} \Rightarrow 100 \text{ ppm} = 3g$$

Different concentrations were prepared from

stock solution 100 ppm

$$M_1 V_1 = M_2 V_2$$

$$100 \times V_1 = 100 \times 100$$

$$V_1 = 10 \text{ ml}$$

Different volumes (1, 2, 3, 4 and 5 mL) was taken from 100 ppm solution and 5 mL of DMG was added in each and total volume was made upto 25 mL by adding distilled water. Solution of unknown concentration was also given.

$\lambda_{\text{max}}$  was determined for a certain solution and then Absorbance at that particular wavelength was determined for each solution and also for unknown solution. Observations were noted and calculations were done to determine amount / Litre.

#### Result:

The amount per Litre of  $\text{Cr(III)}$  is  
172 g/L.

Experiment # 6

Determine the amount of gas in a given sample by Spectroscopy

Apparatus

Beckman UV Visible Spectrophotometer.

Chemicals

Cells  
0.25 % DMG  
Distilled water.

Observations and Calculations

Concentration (mL)	Absorbance
1	0.1
2	0.13
3	0.16
4	0.19
5	0.22
Unknown	0.2

Calculations:-

25 mL of solution contain, 4.3 g of  $G(\text{B})$

1 mL of solution contain,  $4.3 / 25$

1000 mL (1L) of solution contain,  $\frac{4.3}{25} \times 1000$

, 172 g / L of  $G(\text{B})$