

## Determine the absorbance of $K_2Cr_2O_7$ of different concentrations

Experiment # 2

Oct 21, 2019

Determine the absorbance of  $K_2Cr_2O_7$   
at different Concentration

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 substance and path length of the light through the solution.

Mathematical expression is

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

where  $C$  is concentration

$l$  is path length of light

$E$  is molar absorptivity constant

Apparatus:

Beakers, UV-Visible spectrophotometer

Chemicals:

$K_2Cr_2O_7$ , Distilled water

### Procedure:

$K_2Cr_2O_7$  solutions were prepared as

$$\frac{K_2Cr_2O_7}{Cr} = \frac{78 + 104 + 112}{52}$$

$$= \frac{294}{52}$$

$$= 5.65 \text{ g/L}$$

1000 ppm solution (stock) was prepared by dissolving 5.65 g in litre and was further diluted upto 1, 2, 3, 4, 5 and 6 ppm by using dilution formula

$$M_1V_1 = M_2V_2$$

Cuvettes were rinsed with distilled water and one of them was filled with distilled water. The cuvette filled with distilled water was then placed in spectrophotometer and calibrated at 440 nm. The  $K_2Cr_2O_7$  solutions were filled in other cuvettes and absorbance was measured at 440 nm of  $K_2Cr_2O_7$  solutions of 1, 2, 3, 4, 5 and 6 ppm respectively. The absorbance was noted and graph was plotted.

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Apparatus:

Beakers, UV-Visible Spectrophotometer

Chemical:

$K_2Cr_2O_7$ , Distilled water.

Observation and Calculation:

Concentration	Absorbance
1	0.24
2	0.28
3	0.32
4	0.36
5	0.40
6	0.44

