Project Report on

"Preparation of phenol formaldehyde resin (bakelite) in laboratory"

Submitted By

M.Sc. SEM-III Students

(Roll No.01 to 07)

Guided By

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Submitted To

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SIR P.T.SCIENCE COLLEGE, MODASA

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Certificate

This is to certify that project report entitled **"Preparation of Phenol Formaldehyde Resin (bakelite) in Laboraoryt"** are carried out by students mentioned below. They have been satisfactorily completed their project work for academic year 2022-23. The project has been approved as it satisfies the academic requirement in respect of project work prescribed for the Master of Science. -[1]

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Aim :Water analysis of given water sample

1)PH : 7.02

2)Conductivity : 12.98×10^{-3}

3) Total dissolved solids : 0.19

Process:
Take 250ml beaker and clean it by distilled Water and dry it with help of drien. Now weight it Actuality. Take 50 ml water sample in the beaker andEvaporate the near dryness.Now weight it and Calculate the total dissolved solids.

Calculation :

1) Weight of empty beaker : 93.94
2) Weight of beaker + T.D.S : 94.13
3) Weight of T.D.S. = 0.19 gm
   = gm
   = + T.D.S in 50ml sample
   = 0.19 x10
   = 1.9 gm in 1000ml solution

Now, ppm of T.D.S = 1.9 x 1000
= 1900 mg/L

(5) Determination of ca^{+2}:

Requirments : 1. 0.01M EDTA
2. 2N NaoH
3. Muroxide indicator

Process:

Take 25ml Water Sample And 25mlD.W. in Conical Flask and add 2-3ml NaoH.Muroxide as an indicator Titrate at against 0.01M EDTA at the end point the colour will be red to purple.

Observation:

Burette : 0.01 M EDTA
Conical flask : 25ml W.s +25ml D.W + 2-3ml NaoH + indicator
Indicator : Muroxide
Colour change : red to purple

Observation Table :

Burette Reading	I.	II.	III.	Constant
final	3.5	3.4	3.5	3.5
intial	0.0	0.0	0.0	
differences	3.5	3.4	3.5	

Calculation:

1000ml 1M EDTA = 40.08 gm/mol Ca^{+}
ml 0.01M EDTA = (?)

$= \frac{3.5 \times 0.01 \times 40.08}{1000}$

$= 0.001402 \times 40$

$= 0.05611$ gm in 1000 ml w.s

Ppm of Ca^{+2} = 0.05611×1000

$= 56.11$ mg/L

Calculation for co_3^{-2}:

1000ml 1N HCl = 60.009 gm/mol

ml 0.05N HCl = (?)

$$= \frac{1.8 \times 0.05 \times 60.009}{1000}$$

$= 0.0054$ gm CO_3^{-2} in 50 ml c.w.s

$= 0.0054 \times 20$

$= 0.108$ gm CO_3^{-2} in 1000 ml c.w.s

Ppm of CO_3^{-2} = 0.108×1000

= 108 mg/L

Calculation for HCO_3^{-2}:

1000ml 1N HCl = 61.0168 gm/mol HCO_3^{-2}

ml 0.05N HCl = (?)

$$= \frac{17.9 \times 0.05 \times 61}{1000}$$

$= 0.05459$ gm HCO_3^- in 50 ml c.w.s

$= 0.05459 \times 20$

$= 1.0918$ gm HCO_3^- in 1000 ml c.w.s

Ppm of HCO_3^{-2} = 1.0918×1000

$= 1091.8$ mg/L

(7) Determination of Cl^- :

Requirements : 1. 2 % $K_2Cr_2O_7$ solution
2. 0.01N $AgNO_3$
3. Conc.HNO_3
4. $CaCO_3$

Process:

Take 25ml Water Sample in a conical flask add 1 drop conc.Hno_3. Now Heat it 3-4 min add 25 ml 2% $K_2Cr_2O_7$ solution and add pinch of $CaCO_3$ so far tarbidity as show now titrate it against 0.02N $AgNO_3$ Solution at the end point colour change will be yellow to pink.

Observation :

Burette : 0.01 N $AgNO_3$
Conical flask : 25ml W.S +1 drops of conc.HNO_3
+25ml 2% $K_2Cr_2O_7$solution
$CaCO_3$
Colourchange : yellow to pink

Observation table:

Burette reading	I	II	III	Constant
Final	21.3	21.6	21.6	
Initial	0.0	0.0	0.0	21.6
Differences	21.3	21.6	21.6	

Calculation :

1000ml 1N $AgNO_3$ = 35.453 gm/mol
ml 0.01N $AgNO_3$ = (?)

$$= \frac{2.16 \times 0.001 \times 35.5}{1000}$$

= 0.0076668 gm Cl^- in 25 ml W.S

Ppm of Cl^- = 0.007668 mg/25ml W.S.
= 0.007668 × 40 mg/L
= 0.30672 mg/L gm in 1000 ml W.S

= 0.30672 × 1000

= 306.72 mg/L

9) Determination of dissolve oxygen :

Requirements : 1. Orthophospheric acid
2. winkler 'A'
3. winkler 'B'
4. 0.01M $Na_2S_2O_3$
5. 10% KI

Process :

Take reagent bottle complitly filled with W.S. and 1ml winkler 'A' and Winkler 'B' shakewell the bottle when they settle down The ppt for 15min then add 2ml orthophosphoric acid till ppt is dissolved.Now take 50 ml solution in a conical flask add 10ml 10% KI and add starch solution as an indicator titrate it against 0.01M $Na_2S_2O_3$ at the end point violet to colourless.

Observation :

Burette : 0.01M $Na_2S_2O_3$ solution
Conical flask : 50ml w.s. + 10ml 10% KI
Indicator : starch
Colour change: violet to colourless

Observation table :

Burette reading	I	II	III	Constant
Final	0.5	0.5	0.4	
Intial	0.0	0.0	0.0	0.5
Differences	0.5	0.5	0.4	

Calculation :

1000ml 1N $Na_2S_2O_3$ = 8.0 oxygen
0.5 ml .01N $Na_2S_2O_3$ = (?)

$$= \frac{0.5 \times 0.01 \times 8.0}{1000}$$

Ppm of D.O = = 0.0004 in 50 ml o.s

= 0.0004 x 20

= 0.0008 in 1000 ml o.s

= 0.0008 x 1000

= 0.8 mg/L

10) Determination of Chemical Oxygen Demand :

Requirements : 1. 0.05N $K_2Cr_2O_7$solution
2.0.25N $FeSO_4$ $(NH_4)_2SO_4$
3. orthophosphoric acid
4. Aencuric acid
5.0.25N FerrousAmmoniumsulphate
6.Ferroin

Process:

Transfer 10ml of sample in $HgCl_2$ of reflux unit this add 10 ml 0.25N pottasium di-chromate solution pinch of each silver sulphate and alencuric sulphate and 30ml of sulphuric acid. After attaching labing condencer to the mourth of flaric heat the flask an a hot water bath on heating for at nearly to 2 hour to refluxe the contents Cool the flask deficient at form units and dilute it contants of nearly 150ml by adding D.W. and take 10ml solution. Then add 2-3 drops of ferroin indicator solution Now titrate the solution against 0.25N Ferrous Ammonium sulphate solution at the end point blue green colour of constant gets changed the reddish blue run to in nearly a distilled water blank in similar manner

Observation:

Sample reading:

Burette : 0.25N ferrous Ammonium sulphate
Conical flask : 10 ml 0.25N $K_2Cr_2O_7$solution+ Silver sulphate +mencuric sulphate +30ml H_2SO_4 +150ml D.W.

Indicator : Ferroin
Colourchange : Blue green to Readdish brown

Observation table

Burette reading	I	II	III	Constant
Final	0.2	0.2	0.2	
Intial	0.0	0.0	0.0	0.2
Differences	0.2	0.2	0.2	

Blank reading :

Burette : 0.25 N ferrous Ammonium shulphate
Conical flask : 10ml 0.25N $K_2Cr_2O_7$ + silversulphate+ mercuric sulphate +150ml D.W
Indicator : Ferroin
Colourchange : blue green to reddish blue

Observation table:

Burette reading	I	II	III	Constant
Final	1.2	2.0	1.2	
Intial	0.0	0.0	0.0	1.8
Differences	1.2	2.0	1.8	

Calculation:

$$C.O.D.(mg/L) = \frac{(B-T)\ XN \times 1000 \times 8}{10}$$

$$= \frac{1.0 \times 0.25 \times 1000 \times 8}{10}$$

$$= 200\ mg/L$$