

Titration Curves of a Strong and a Weak Acid with
a Strong Base.

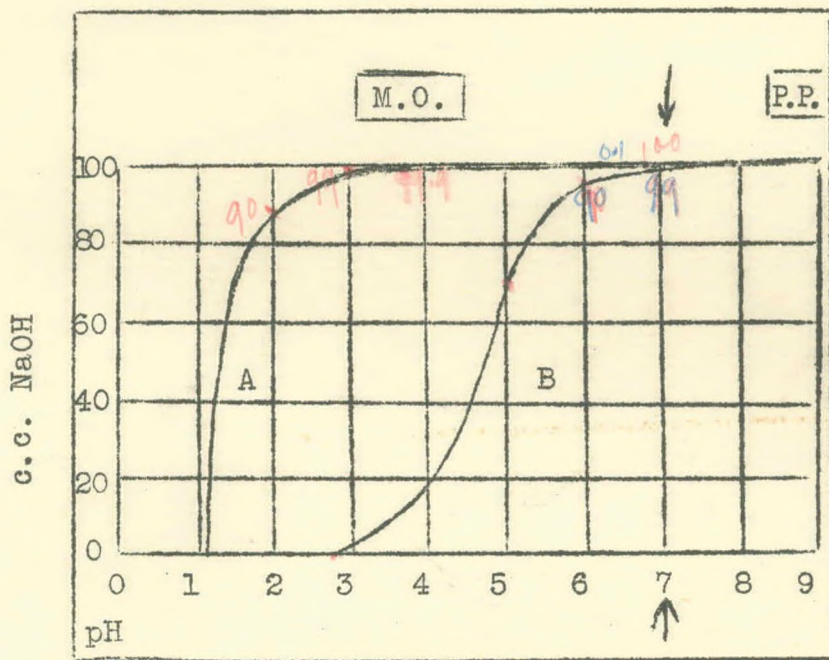


Fig. 1.

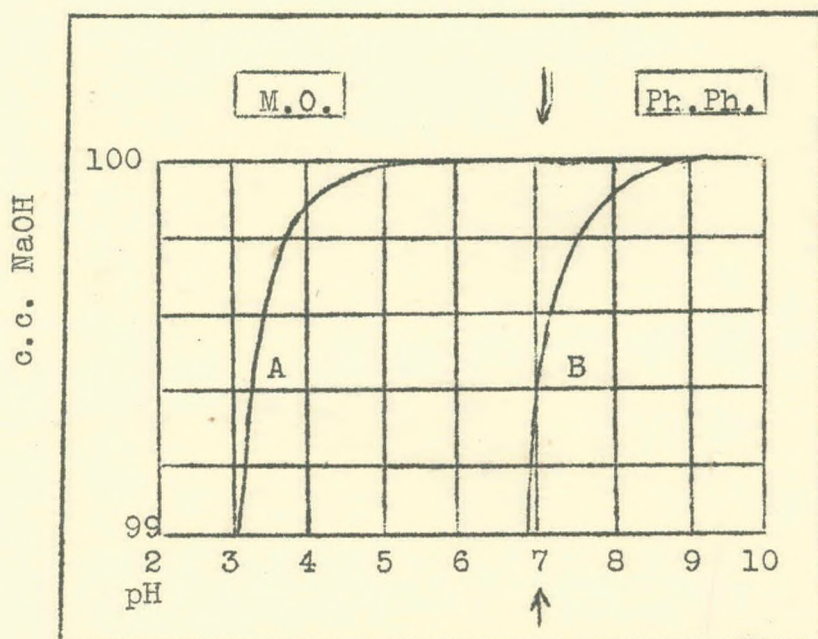


Fig. 2.

Curves A = 0.1N.HCl
 " B = Acetic Acid
 M.O. = Methyl Orange colour range
 P.P. = Phenol Phthalein

23
35.5
58.5

1 litre of N. N. → 58.5 gm N. d.

D.P.H

Practical V.

- Determine the amount of chloride chlorine in:-
(a) tap water, (b) sewage effluent A, (c) water B.

Express your result as parts per 100,000 and also as grams per gallon in terms of chlorine and of sodium chloride.

[Given 0.01N Silver Nitrate]

- Test the waters C, D, E, and F for the presence of poisonous metals.

Determine the amount present in water C.

(a) Tap water 100 cc + K_2CrO_4 + 8 cc $AgNO_3$ → Brackish yellow neutral to litmus

(b) sewage eff. A 100 + K_2CrO_4 + 25.6 cc $AgNO_3$ 10 IN. neutral

(c) water B 100 — 8.6 cc $AgNO_3$ acid K_2CrO_4 dissolves in acid.

$100 \text{ cc } H_2O \text{ req. } 8.6 \text{ cc } 0.01N \text{ } AgNO_3$
 $1 \text{ cc } H_2O \text{ req. } 0.086 \text{ cc } 0.01N \text{ } AgNO_3$
 $1 \text{ cc } AgNO_3 = 0.01 \text{ mgm. Cl}$
 $100 \text{ cc } H_2O \text{ req. } 8.6 \text{ cc } 0.01N \text{ } AgNO_3$
 $100,000 \text{ mgm } H_2O = 100,000 \times 0.086 = 8600 \text{ mgm } AgNO_3$

$\frac{8600}{100000} = 0.086$
 $\frac{0.086}{100} = 0.00086$
 $\frac{0.00086}{100000} = 8.6 \times 10^{-6}$

$1 \text{ litre } N. Cl = 35.5$
 $1 \text{ litre } 0.01N \text{ } AgNO_3 = 35.5 \times 0.01 = 0.355$
 $1 \text{ cc } 0.01N \text{ } AgNO_3 = 0.355 \text{ mgm } Cl$
 $8.6 \text{ cc } 0.01N \text{ } AgNO_3 = 8.6 \times 0.355 = 3.053 \text{ mgm } Cl$

$1 \text{ litre } 0.01N \text{ } AgNO_3 = 35.5 \times 0.01 = 0.355$
 $1 \text{ cc } 0.01N \text{ } AgNO_3 = \frac{0.355}{1000} = 0.000355 \text{ gm } Cl$

$100,000 \text{ mgm } H_2O = 8.6 \times 0.355 \text{ mgm } Cl = 3.053 \text{ mgm } Cl$
 $100,000 \text{ mgm } H_2O \text{ contains } 3.053 \text{ parts } Cl$

Pb Cu
C D

Fe Zn

Fresh

Black. White pp

Mag's Light Brown Light Brown
Hcl. Colour Colour disappears

KCN Colour Colour remains

Fresh Solution $\text{D} + \text{HCl} + \text{K}_2\text{Cr}_2\text{O}_7 \rightarrow$ Brown pp

$\text{D} + \text{HCl} + \text{K}_2\text{Cr}_2\text{O}_7 \rightarrow$ Blue pp

Practical VII.

1. Estimate in water (A) the ammoniacal nitrogen by
 - (i) direct Nesslerisation
 - (ii) the Wanklyn process

2. Test water (B) for the presence of free chlorine.

Carry out the following two tests for free chlorine:

(a) Add a few drops of potassium iodide solution and a drop or two of starch solution. Iodine is liberated if free chlorine is present and a blue colour is obtained with the starch. This test is not specific.

(b) If a few drops of an o-tolidine solution in acetic acid are added to water containing free chlorine an intense yellow colour develops.

Ammonia free H₂O 50 ml + starch 2 cc ss.
 " " " " 50 " " 1 cc
 " " " " 50 " " "

Direct nesslerisation 50 cc + Nessler's soln 2 cc + starch 1 cc
 1 cc contains 0.01 mgm. N₂
 ∴ 50 cc " " 0.01 x 2
 ∴ 100 cc " " $\frac{0.01 \times 2 \times 2}{50} = 0.04 \text{ mgm. } 10^5 \text{ H}_2\text{O}$

Wanklyn's Indication process
 25 cc starch + Nessler required 25 cc ss.

50 ml Distilled = 8 ml S. Amell.
 ∴ 250 ml " " = 40 ml S. Amell. (1 cc S. Amell = 0.01 mgm. NH₃)
 = 0.40 mgm. NH₃
 ∴ 500 ml Water = 0.4 mgm. NH₃
 ∴ 100 ml " = 0.08 mgm. NH₃

Practical VII.

1. Test the sample of water (A) for nitrite, qualitatively and quantitatively.
2. Test the tap water for the presence of nitrate and if present determine the amount.
3. Estimate the "nitric nitrogen" in the sample of sewage works effluent (B).

12 cc Nessler

20 cc. Sewage B match 50 cc std. soln.

$$\frac{20}{50} \text{ Sample} = 50 \text{ cc Standard} = 0.1 \text{ mgm N}$$

(10 cc. KNO_3
 $1 \text{ cc} = 0.01$)

$$\frac{20}{50} \times 10 \text{ cc Water} = 0.1 \text{ mgm N}$$

$$10 \text{ cc Water} = 0.1 \times \frac{50}{20} \text{ mgm N}$$

$$100 \text{ cc} = 0.1 \times \frac{50}{20} \times \frac{100}{10}$$
$$= \frac{50}{2} = 2.5 \text{ mgm.}$$

$$= \underline{\underline{2.5 \text{ gm per } 10^5}}$$

1000) 75.50 355

Practical XV

- Determine the protein content of the wheat flour provided.
[Use about 0.5 gm. of the flour. Digest in a Kjeldahl flask with 20 cc. of concentrated H_2SO_4 .]
- Note the general character of the flour and satisfy yourself that it contains "gluten". This "gluten" is soluble in alkali and in acetic acid. Test such a solution for proteins by means of such tests as Millon's, the glyoxylic and the xanthoproteic. Perform these test also on (1) phenol, (2) benzoic acid, and (3) salicylic acid.
- Examine the starches set out under the microscopes.

Starch
white filtrate
does not give
red line colour (blue)

Suppose 6.5 cc of .1N NH_3 came from
0.5 gm's flour

i.e. 0.5 gm's flour contains $\frac{6.5 \times 1.4}{100}$

(5.68 is the factor for converting wheat
nitrogen into protein $\Rightarrow \frac{6.5 \times 1.4 \times 5.68}{1000}$ mg Rate)

∴ 100 gm's flour contains $\frac{100}{0.5} \times \frac{6.5}{1000} \times 1.4 \times 5.68$

= 10.34 gm's prot.

i.e. 10.34%

D.P.H.

Practical XXII.

1. Identify the disinfectants A and B.
2. Estimate the strength of (a) the given sample of bleaching powder, (b) the solution of chlorine.
Use two methods and compare your results.
3. Determine the strength of the phenol solution C.
Express your results as a normality and as grams per cent.

(a) 10cc. suspension
5.2cc. Sol. arsenic
1.1cc. I₂

10cc. sol.
3cc. Sol. arsenic
15cc. I₂

16.6cc. 0.1N Sol. Phoscopy

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