Department of Mathametical and Phycal Scienecs
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Course Instructor: Md. Nazmul Abedin khan
Course Code: 109
Course Title: CHE

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ID: 2021-3-60-016
Section: 5

Experiment-2: Standardization of a strong acid (HCl) with a standard strong base (NaOH).

Theory:

The purpose of this experiment is to examine potential sources of error in concentration of HCl. The concentration of HCl can be determined by titrating with standardized NaOH solution. The NaOH (aq) can be standardized by using the primary standard, potassium hydrogen phthalate (KHP).

During the neutralization reaction, 1 mol of NaOH reacts with 1 mol of HCl according to the following

Equation:

NaOH (aq) + HCl (aq) NaCl (aq) + H 2 O (l) ……..(1)

Therefore, the concentration of standardized HCl can be determined from reaction (1):

(M NaOH ×V NaOH) = (M HCl × V HCl)…… (2)

Va x Ma = Vb x Mb

Where,

Mb = Molarity of NaOH 1

Va = Volume of HCl 10

Vb = Volume of NaOH = Average burette reading, mL 10.5

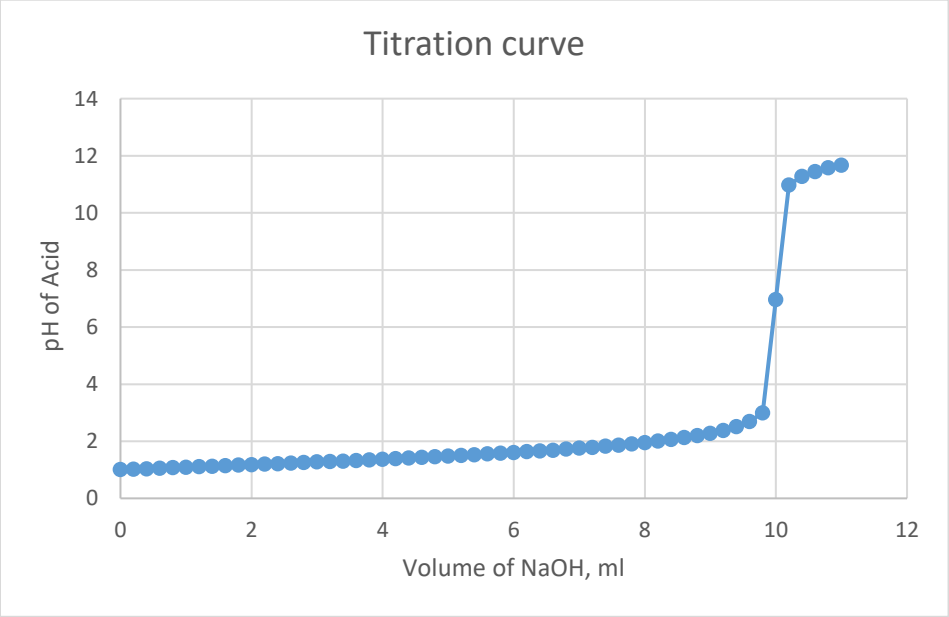
Ma = Molarity of HCl ?

Data:

Volume of NaOH, ml	pH of Acid
0	1.01
0.2	1.03
0.4	1.04
0.6	1.06
0.8	1.08
1	1.09
1.2	1.11
1.4	1.13
1.6	1.15
1.8	1.17

2	1.18
2.2	1.2
2.4	1.22
2.6	1.24
2.8	1.26
3	1.28
3.2	1.29
3.4	1.31
3.6	1.33
3.8	1.35
4	1.37
4.2	1.39
4.4	1.42
4.6	1.44
4.8	1.46
5	1.48
5.2	1.51
5.4	1.53
5.6	1.56
5.8	1.58
6	1.61
6.2	1.64
6.4	1.66
6.6	1.69
6.8	1.73
7	1.76
7.2	1.79
7.4	1.83
7.6	1.87
7.8	1.91
8	1.96
8.2	2.01
8.4	2.07
8.6	2.13
8.8	2.2
9	2.28
9.2	2.38
9.4	2.51
9.6	2.69
9.8	3
10	6.97
10.2	10.98
10.4	11.28
10.6	11.45
10.8	11.58
11	11.67

Va x Ma = Vb x Mb	
Va, Volume of HCl	**10 ml**
Ma, Molarity of HCl	**?**
Vb, Volume of NaOH	**10.2 ml**
Mb, Molarity of NaOH	**0.1M**
Ma=Vb*Mb/Va	**0.102M**



Percentage Error:

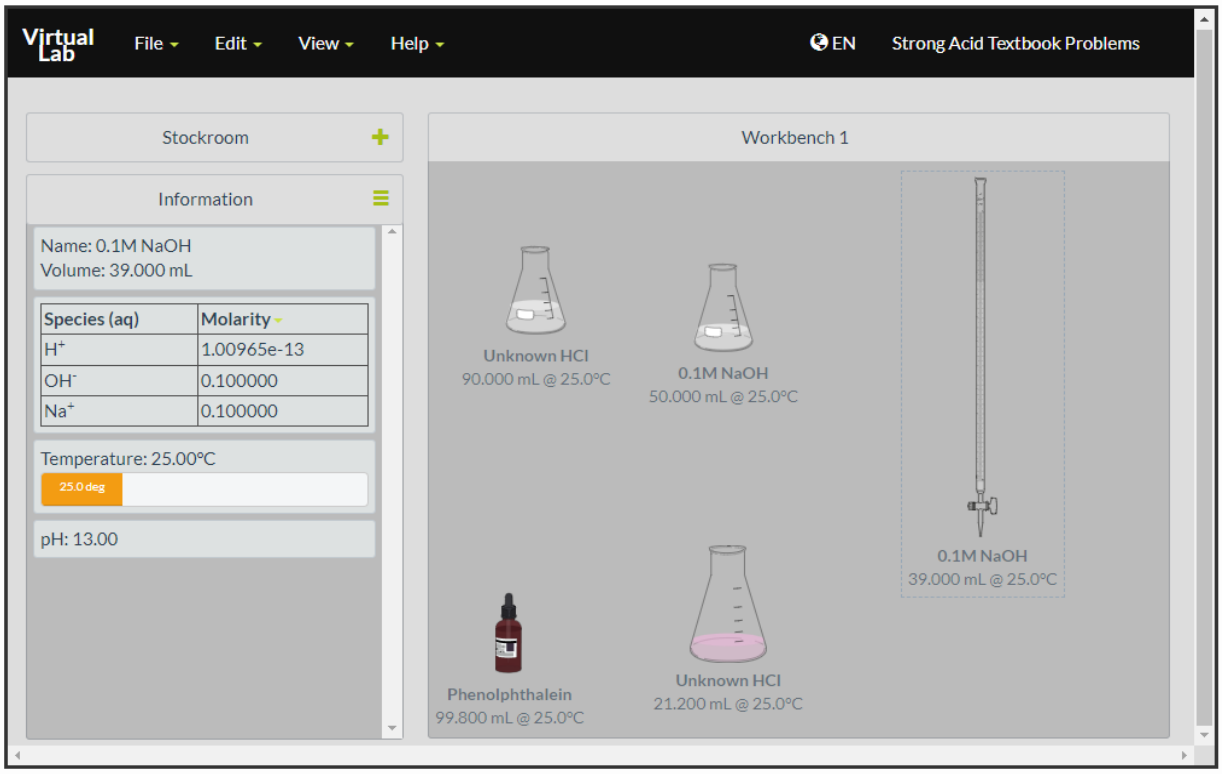
Error = [{(0.1-0.102)/0.1} x 100] %

= 2%

VIRTUAL LAB: Strong Acid and Base Problems

We are pleased to announce a new HTML5 based version of the virtual lab. Please use FireFox or Chrome web browser to access this page, errors have been reported when using Internet Explorer.

Introductory Video and Support Information



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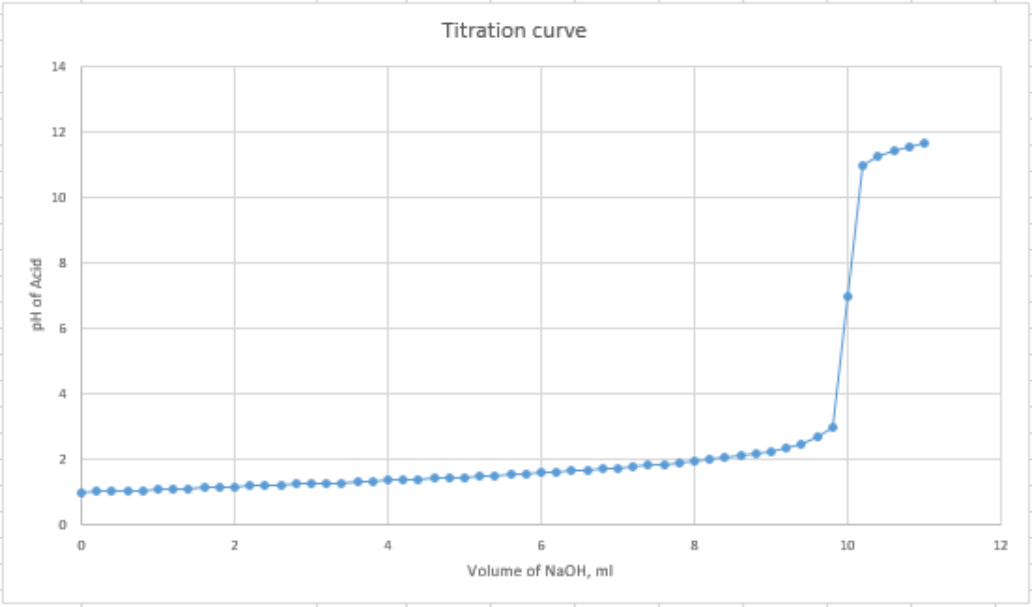

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Error	2%