

COVID 12 Class Chem

- 1) K_A ? #4 % con 33
- 2) lab titration of a strong vs weak acid

[unknown]

Titration of a Strong Acid versus a Weak Acid

100% ion^x

What is the difference between a strong acid and a weak acid?

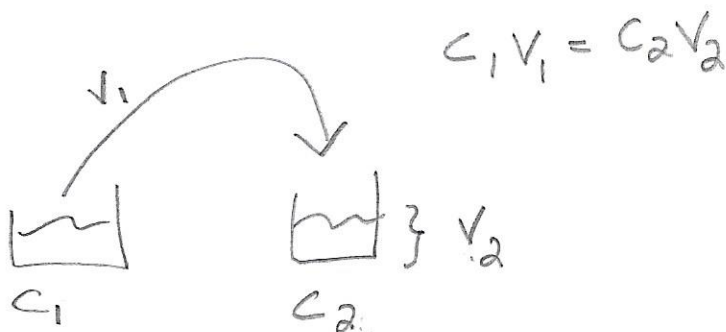
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Purpose

- to compare the titration of weak acid versus a strong acid with NaOH

Materials

- 0.10 mol/L HCl and CH₃COOH
- pipets
- 4 large test tubes
- 8 small test tubes
- 10 mL graduated cylinder
- Orange IV indicator
- Methyl Orange indicator



Preparation of Serial Dilutions

start with 1 conc → dilute = new conc

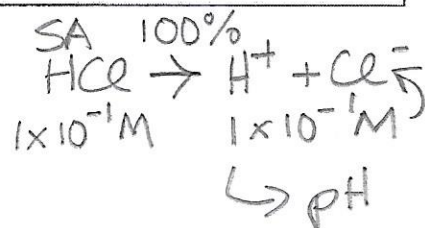
↓ dilute
↓ new new conc.

Test Tube	Procedure	Concentration (M)
1 pH 1	Put 10.0 mL of 0.10 M HCl into test tube 1	0.10 M
2 pH 2	Pipet 1.0 mL of 0.10 M HCl from test tube 1 into test tube 2 plus 9.0 mL of water	0.010 M $V_d = 10$ mL
3 pH 3	Pipet 1.0 mL from test tube 2 into test tube 3 plus 9.0 mL of water	0.0010 M
4 pH 4	Pipet 1.0 mL from test tube 3 into test tube 4 plus 9.0 mL of water	0.00010 M

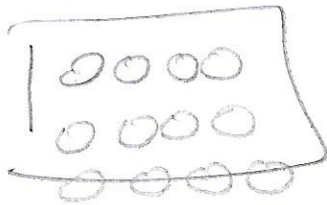
$1.0 \times 10^{-1} M$
 $1.0 \times 10^{-2} M$
 $1.0 \times 10^{-3} M$
 $1.0 \times 10^{-4} M$

Sample Calculation of Concentration of HCl in Test Tube 2:

$C_1 V_1 = C_2 V_2$
OR = D.A.



Procedure 1:



ind 1
orange
pH 1 2 3 4
UUUU

ind 2
pH 1 2 3 4
UUUU methyl orange

- Split each large test tube into 2 small test tubes each.
- Add a drop of indicator Orange IV into each of the first set of test tubes.
- Add a drop of indicator Methyl Orange to each of the second set of test tubes.

Sample Calculation of pH of Test Tube 1 using $\text{pH} = -\log [\text{H}^+]$

indicator lab
but into 4
tt

$$\text{pH} = -\log [\text{H}^+]$$

100%

Test Tube	Concentration of [HCl] SA	Concentration of [H ⁺]	Colour with Orange IV	Colour with Methyl Orange	pH
1	1×10^{-1}	1×10^{-1}			1
2	1×10^{-2}				2
3					3
4					4

Procedure 2:

- Pipet 3.0 mL of 0.10 mol/L CH₃COOH into small Test Tube 5A
- Add a drop of Orange IV
- Pipet 3.0 mL of 0.10 mol/L CH₃COOH into small Test Tube 5B
- Add a drop of Methyl Orange

CH₃COOH
0.10M

0.10M
CH₃COOH

Orange IV
methyl orange

find the pH

Test Tube		
5A	Colour with Orange IV	
5B	Colour with Methyl Orange	

pH of 0.10 mol/L CH₃COOH pH 3

Procedure 3: Titration of HCl

- place 20 drops of 0.10 mol/L HCl in Test Tube 6
- add 1 drop of BTB
- add 0.10 M NaOH drop by drop until green approx. pH 7

BTB green

Number of drops _____

Procedure 4: Titration of CH₃COOH

- place 20 drops of 0.10 mol/L CH₃COOH in Test Tube 7
- add 1 drop of BTB
- add 0.10 M NaOH drop by drop until green approx. pH 7

Number of drops _____

Class Results

Test Tube		Average Number of drops of NaOH to turn green
0.10 M HCl	20d	20
0.10 M CH ₃ COOH	20d	18