Lesson Plan

Conductimetric Titration of Acid-Base Neutralization

Date: 1st July, 2006

2nd Grade of Amaki Super Science High School

Subject: "Environmental Chemistry in English"

Duration: 180 nim (3h)

Objective: - To differentiate between HCl(aq) as strong acid and CH_3COOH(aq) as weak acid, and to expose students the practical activities on acid-base titration by using conductivity method.

Lesson Development:

Time	Key Contents	Teacher's activity	Students' activity
15 min	**Introduction/review**	In the previous lesson you used conductivity method to examine the amount of dissolved salt in samples. To apply conductivity method in environmental analysis, I asked you in group to examine the amount of dissolved salt in water and soil samples. Therefore, before continuing our lesson today I want two groups of you come on black board and do presentation of your results.	
	Students' presentation	☞Ask 2 groups of students to present their experimental results of the assessments given in the previous lesson. ☞Facilitate students' presentation	Do presentation

35 min	**Review students' experimental results in the previous lesson (neutralization of HCl(aq) and NaOH(aq)**	In the previous lesson, after you determine the amount of dissolved salt in solution, you also used conductivity method in investigation of HCl(aq) and NaOH(aq) neutralization. ☞Show the neutralization graph done by students in the previous lesson. Can you interpret the graph?	 Ask one student to interpret the graph
	Neutralization of CH_3COOH(aq) and NaOH(aq)	Next, I want you to investigate the neutralization of CH_3COOH(aq) and NaOH(aq) and see how different it is from the neutralization of HCl(aq) and NaOH(aq). ☞Use worksheet to explain the experimental procedures. ☞Facilitate students' activities.	 Conduct experiment by group and fill in the worksheet.
10 min	**Break**		
50 min	**Experimental result analysis**	Now you have two graphs of neutralization results, that are the neutralization of HCl(aq) and NaOH(aq), and the neutralization of CH_3COOH(aq) and NaOH(aq). I want you to compare these two graphs and tell the differences.	Give the differences

		Why did they give the different graphs? Do you have any ideas to explain the reason?	Give their opinions
	HCl disassociates 100% as H^+ and Cl^- in aqueous solution, but CH_3COOH disassociates just only 1% as CH_3COO^- and H^+. Other 90% is CH_3COOH(aq).	To explain this reason, let see what are in the solution of HCl(aq) and CH_3COOH(aq)?. ☞Using a drawing poster showing the different disassociation between HCl and CH_3COOH in the solution to explain.	
	Neutralization of HCl(aq)-CH_3COOH(aq) mixture and NaOH(aq)	You are going to investigate another acid-base neutralization. In this case, the mixture of HCl(aq) and CH_3COOH(aq) is used in neutralization. Therefore, you need to determine the each amount of HCl(aq) and CH_3COOH(aq) in the mixture. ☞Use students' worksheet to explain the experimental procedures. ☞Facilitate students' activities. ☞Facilitate students to answer the questions in the worksheets.	Conduct experiment and fill in the worksheet.
10 min	**Break**		

10 min	**Students' presentation**	☞Ask two groups of students to present the experimental results.	Do presentation
20 min	**Application of conductivity method**	You have learned and used conductivity method in several observations. Now, I want all of you to discuss in group to think about the application of conductivity. What kinds of investigations that you would use conductivity method? And how are your procedures or operations?	Discuss in group
	Students' presentation	☞Ask some groups of students to present their ideas.	Do presentation
5 min	**Conclusion**	☞Conclude the lesson	
15 min	**Post-test and questionnaire**	Prepare students post-tests and questionnaires.	Fill in post-tests and questionnaires