

Lesson Plan

Determination of Detergent in Sample Solution

PONAL KIT and Cloth Dyeing Method

Lesson 3, Date: 15th December, 2005

1st Grade of Amaki Super Science High School

“Environmental Chemistry in English”

Duration: 50 nm

Objective: - To provide students experiences to determine the amount of detergent in sample solution by using two methods, PONAL KIT and cloth dyeing method.

Lesson Development:

Time	Key Contents	Teacher’s activity	Students’ activity
10 mn	<p>Generality of Detergent Detergent is substance that used for washing, cleaning etc. Detergent is flowed into river, lake or sea from kitchen, factory or industry and it affects on the bodies of water such as lowers water surface tension and biomass. Like soap, detergent has two parts in the molecule, head part and tail part. Head part is known as <i>Hydrophilic</i> and dissolves in water, whereas tail part is known as <i>Hydrophobic</i> and doesn’t dissolve</p>	<p>Revision of the previous lesson and introduction: On the previous lesson, you studied about a property of water that is “Surface tension of water”. You investigated the effect of detergent on surface tension of water through weighing water drops. Therefore, to start our lesson today, I want you to discuss in group to give the information that you know about detergent. Namely, what do you know about detergent?</p> <p>-Summarize students’ ideas about detergent and</p>	<p>Discuss in group and write freely about detergent.</p>

	<p>in water. However, Soap differs from detergent at its head in which the head of soap is composed by carbonate anion ($-\text{COO}^-$) and that of detergent is composed by sulfonate anion ($-\text{SO}_3^-$).</p>	<p>provide additional explanation.</p>	
30 mn	<p>PONAL KIT method: Detergent (anion) is reacted with cobalt complex (cation) to form a neutral compound. Then, this neutral compound is extracted by dissolving in benzene (solvent). The extractant is measured absorbance by absorbance machine.</p> <p>Cloth dyeing method: Anion detergent is reacted with cation methyl violet to form neutral compound. Then, this neutral compound is extracted by cloth. The color intensity of cloth is measured by hand made reflection photo meter.</p>	<p>Here, you are going to experience to determine detergent amount in sample solution. There are two methods that I am going to introduce to you today. First is PONAL KIT method that is a common method used by scientists. Second is cloth dyeing method that is a new developed method.</p> <p>-Explain the procedure of experiments by using experimental worksheets.</p> <p>-Facilitate students' activity</p>	<p>Conduct experiment by group</p>
10 mn		<p>-Ask students to record their results on black board by group and then plot the graph.</p> <p>-Do the conclusion.</p> <p>The detail discussion of the results would be done in the next lesson.</p>	<p>-Record the results on black board and plot the graph.</p>

