

# Students' Note

2005/12/15

## Key questions

1. What do you know about ***Detergent***? What is it used for?

2. How can we determine the detergent concentration in sample water?

# Determination of detergent amount in sample solution

## (1) PONAL KIT Method

### Material

Cobalt complex tablet (ABS kit), absorbance machine (CO7500) (1), 100 mL measuring flask (1), 10 mL measuring cylinder (1), dropper (1), (1) and quartz (test tube) (1).

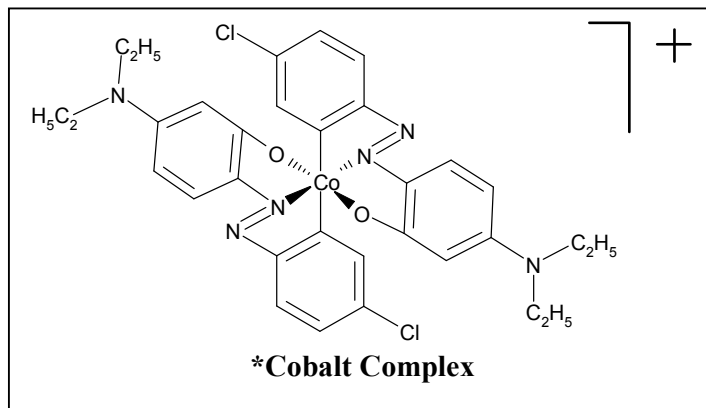
### Sample

Each group has one sample of detergent solutions: 2 ppm, 4 ppm, 6 ppm, 8 ppm and 10 ppm.

### Procedure

1. Put 5 mL of detergent solution into a 100 mL measuring flask and then add distilled water until you get 100 mL volume. Now your sample was diluted 20 times.
2. Add 2 tablets of Cobalt Complex\* and shake solution well.
3. Add 4 mL of benzene and re-shake solution for about 2 min with the maintaining the temperature in water bath about 30 °C.
4. Keep the mixture for about 3 minutes in order to allow the solution to separate into two phases.
5. Using a dropper, remove the upper layer solution (Benzene phase) carefully and put it into a test tube and cap it.
6. Measure absorbance of this upper layer phase by absorbance machine at 550 nm. Record absorbance value into the result table.

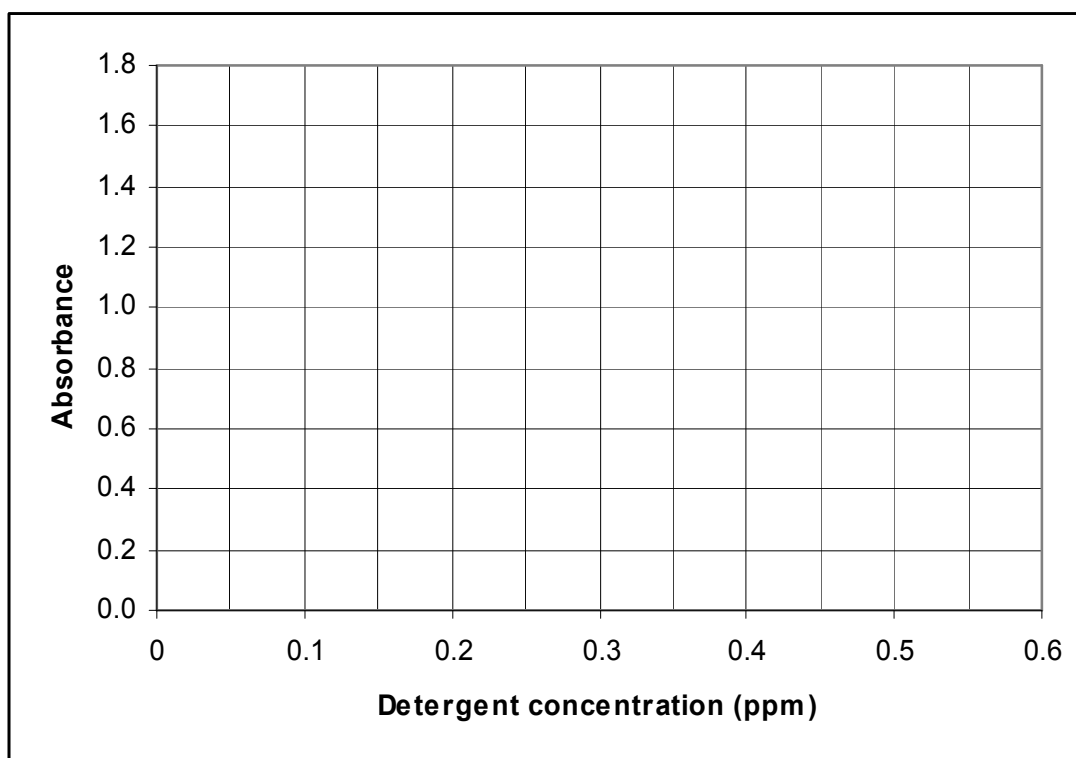
*Note:* You need to record the absorbance results from other groups and then plot the graph showing the relationship between detergent concentration and absorbance.



### Result

Detergent Concentration (ppm/20)	0.1	0.2	0.3	0.4	0.5
Absorbance					

Plot the graph showing the relationship between detergent concentration and absorbance.



## (2) Cloth Dyeing Method

### Material

100 mL beaker (1), 10 mL measuring cylinder (1), forceps (1), White cloth (Cashimelon Acrylic type) 1 piece, Hair dryer (1), CdS-LED Photo meter (1), Multi meter(1).

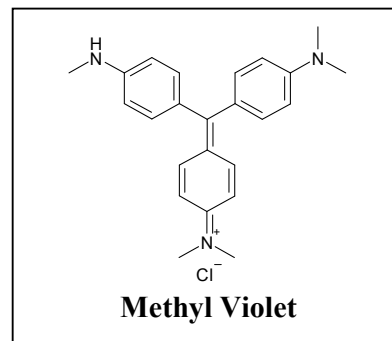
### Sample

Each group has one sample of detergent solutions: 2 ppm, 4 ppm, 6 ppm, 8 ppm and 10 ppm; and 0.005%w/v crystal violet solution (dye).

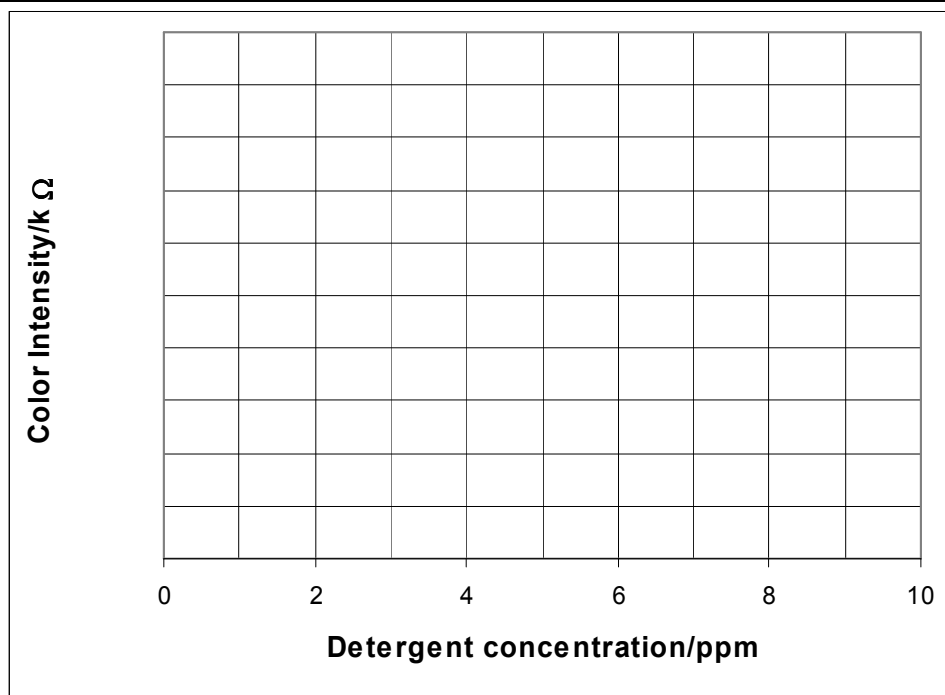
### Procedure and Result

1. Put 10 mL of a detergent solution into a 100 mL beaker.
2. Add 2 mL of crystal violet solution into each beaker, and stir the solution about 1 min in the water bath at about 30 °C.
3. Deep the cloth into the solution for 15 min by keeping maintaining temperature at about 30 °C in the water bath.
4. By using forceps, remove the piece of cloth from the solution and dry it by hair dryer.
5. Measure the color intensity of dyed cloth by photo reflection meter and record it.

*Note:* You need to record the results from other groups and then plot the graph showing the relationship between detergent concentration and color intensity of dyed cloth.



Detergent con./ppm	2	4	6	8	10
Color Intensity/kΩ					



## Home Work (Group Research Works)

Your group is required to use the methods you learned in the classroom to determine the detergent concentration in various water bodies and do the comparison. Therefore, your group is required to collect the samples from various places to determine the detergent concentration.

### I. PONAL KIT Method:

1. Put 100 mL of your water sample into a 100 mL measuring flask.
2. Add 2 tablets of Cobalt Complex\* and shake solution well.
3. Add 4 mL of benzene and re-shake solution for about 2 min with the maintaining the temperature in water bath about 30 °C.
4. Keep the mixture for about 3 minutes in order to allow the solution to separate into two phases.
5. Using a dropper, remove the upper layer solution (Benzene phase) carefully and put it into a test tube and cap it.
6. Measure absorbance of this upper layer phase by absorbance machine at 550 nm. Record absorbance value into the result table.
7. Using the plotted graph obtained in the classroom, convert the absorbance of your water sample into detergent concentration.

Name of the sample area	Absorbance	Detergent concentration

**Your comments:**

## II. Cloth Dyeing Method:

1. Put 10 mL of your water sample into a 100 mL beaker.
2. Add 2 mL of crystal violet solution into each beaker, and stir the solution about 1 min in the water bath at about 30 °C.
3. Deep the cloth into the solution for 15 min by keeping maintaining temperature at about 30 °C in the water bath.
4. By using forceps, remove the piece of cloth from the solution and dry it by air or hair dryer.
5. Measure the color intensity of dyed cloth by photo reflection meter and record it.
6. By using the plotted graph obtained in the classroom, convert the resistance of your sample into detergent concentration.

**Note:** In the case that you could not obtain the good graph in the classroom, your group needs to conduct the procedures in the worksheet where you used in the classroom again. You have to examine all the standard detergent solutions (from 2 ppm to 10 ppm) in order to make a standard graph for your own group. And then you can determine your sample later. You must use your group CdS-LED reflection photo meter only.

Name of the sample area	Absorbance	Detergent concentration

**Your comments:**