

# Waste Management in the Laboratory



By Mrs. Kanchuree Wongwairatakul : Scientist

The Center for Scientific and Technological Equipment , Walailak University.

# Classification of waste within the laboratory

Non-hazardous waste : ordinary waste, paper

Hazardous Waste

Solid Waste  
divided into 7 types

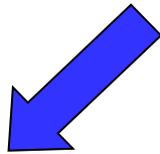
Liquid waste and special  
hazardous waste divided into  
21 types



# Flow chart Waste classification

Within the laboratory according to The Center for Scientific and Technological Equipment

Hazardous waste is divided into 2 types.



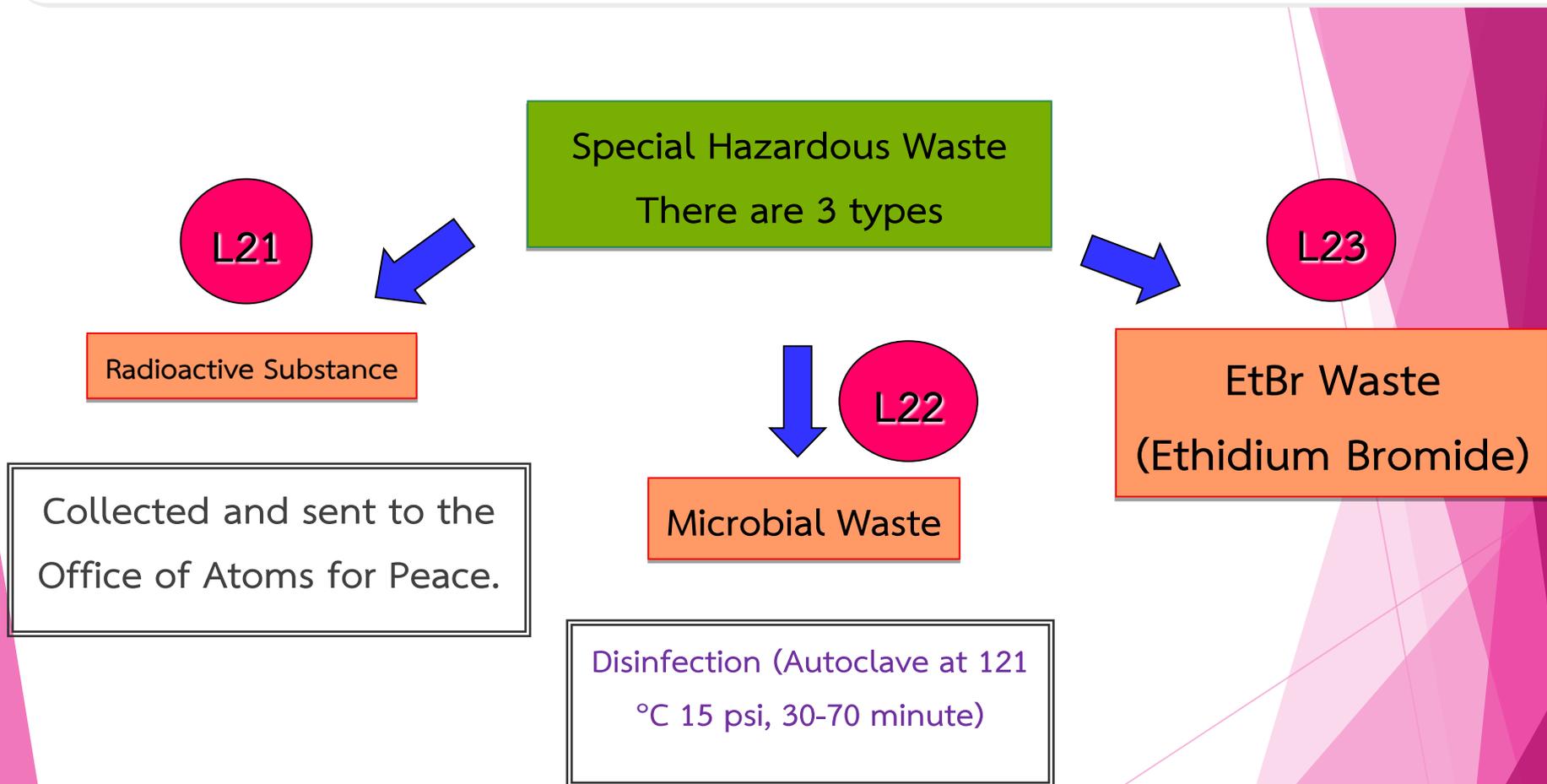
Solid  
classified into 7 types



Special hazardous liquids and wastes  
Classified into 21 types  
(18 types of liquids)  
(3 types of special hazardous waste)

# Flow chart Waste classification

Within the laboratory according to The Center for Scientific and Technological Equipment



# Liquid Waste 18 types



oxidizing agent

L12

reducing agent

L13

flammable substance

L18

substances obtained from photography

L19

explosive waste

L20

cyanide

Y

inorganic cyanide  
organic cyanide

L05-06

N

mercury

Y

inorganic mercury  
organic mercury

L08-09

N

chrome

Y

L07

N

arsenic

Y

L10

N

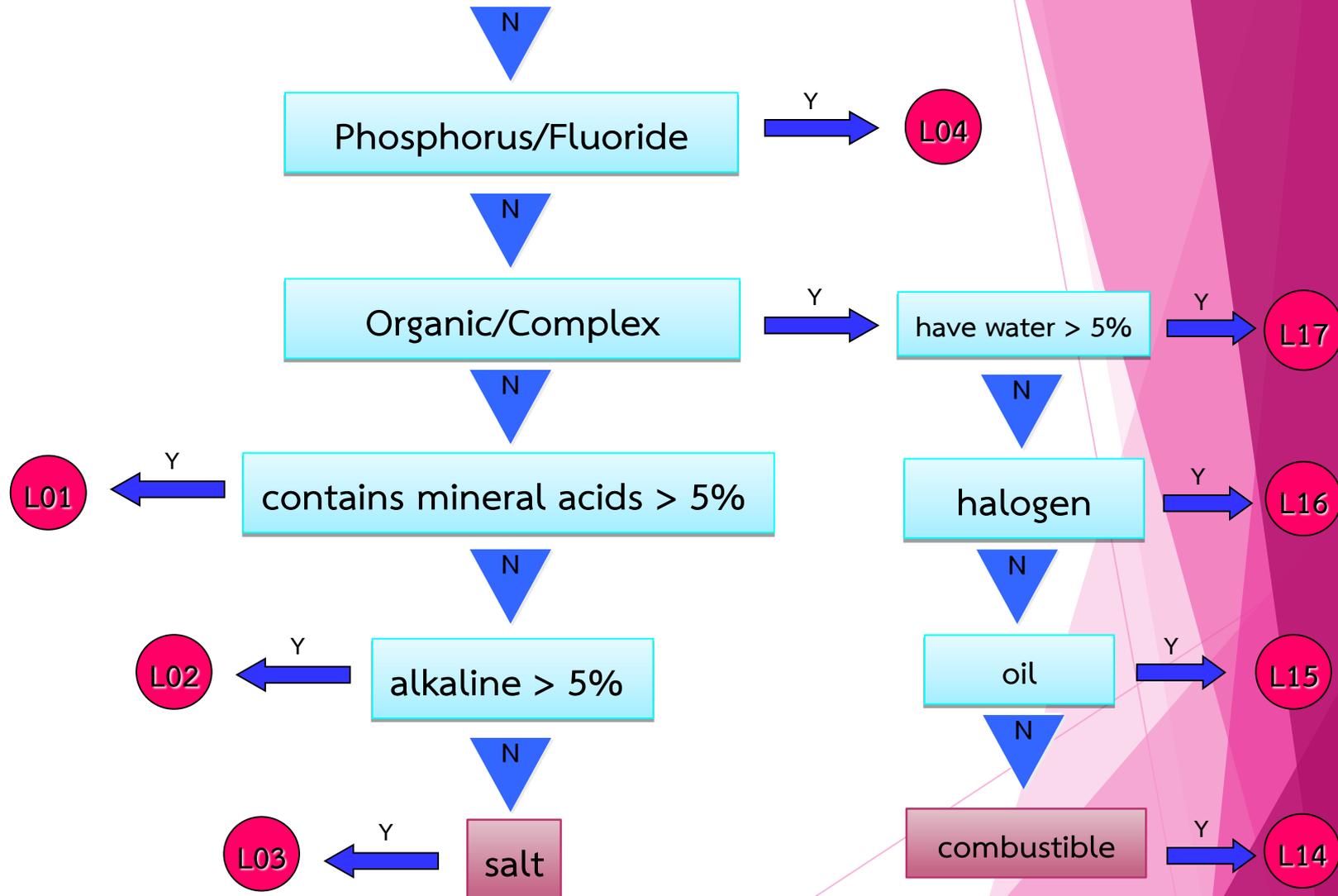
Other heavy metals that exceed the standard

Y

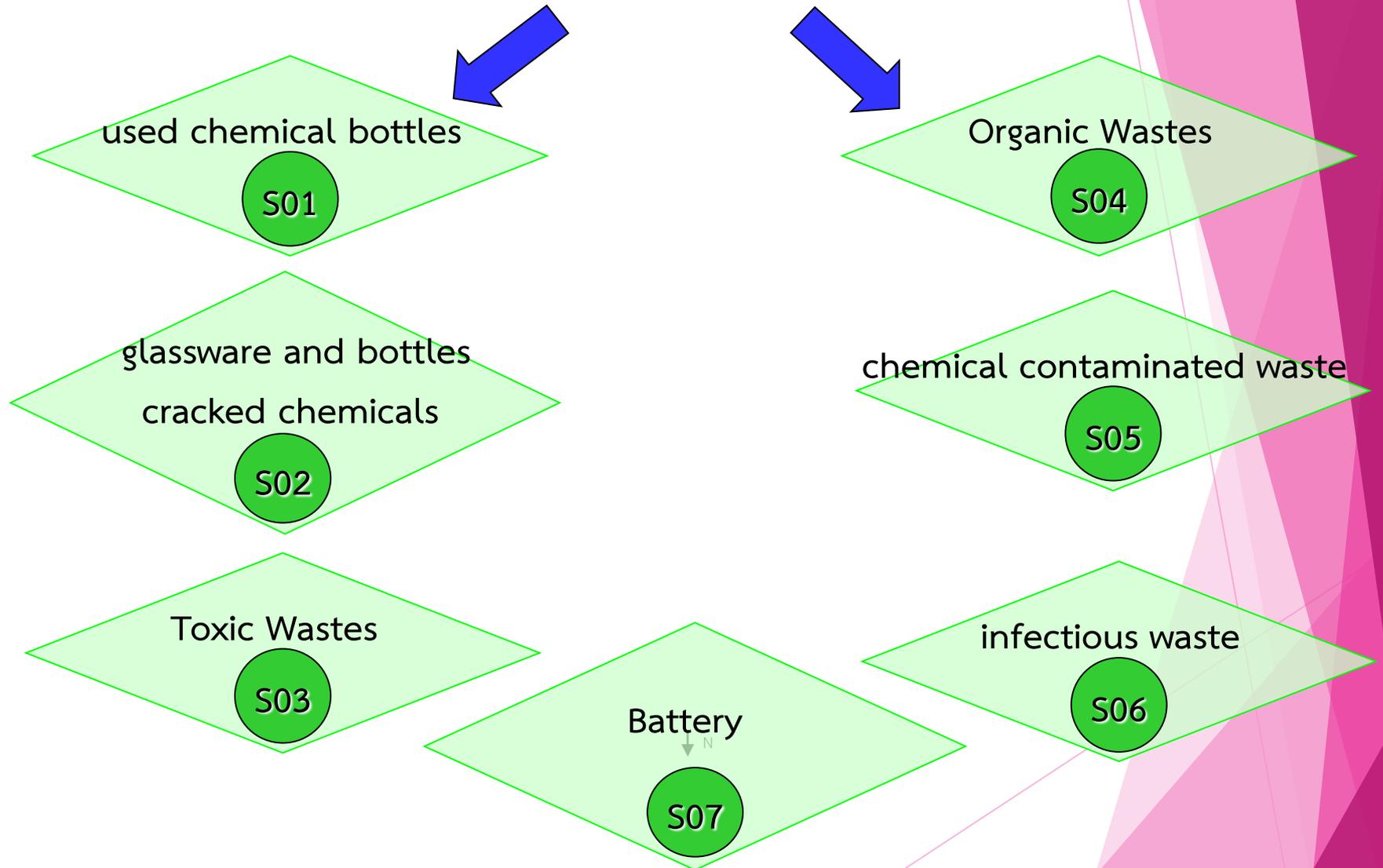
L11



# Liquid Waste 18 types (continue)

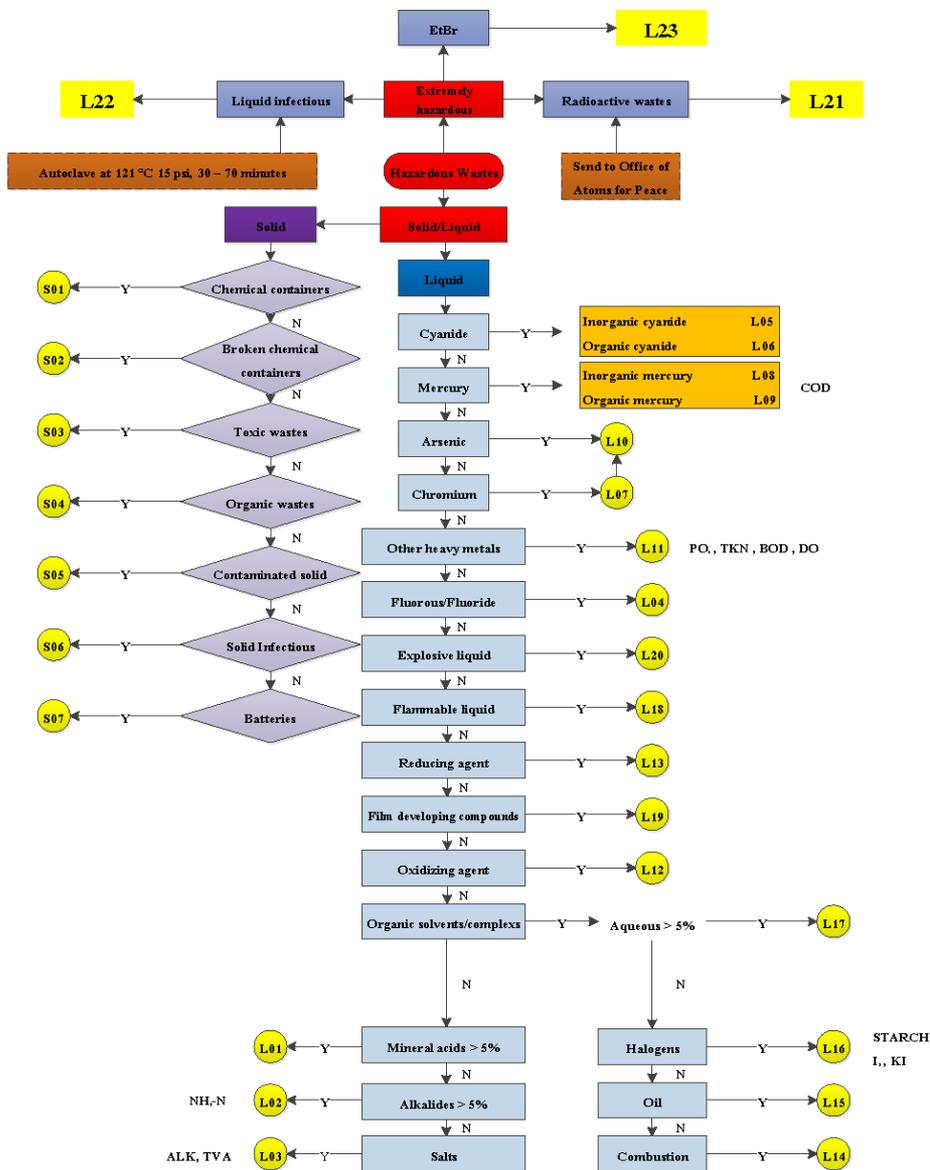


# Solid wastes are classified into 7 types.





# Laboratory Waste Disposal Guide



## Details of the classification of waste in the laboratory according to The Center for Scientific and Technological Equipment

➡ Meaning :

➡ Example :

➡ Storage :

➡ Treatment/Elimination :

Each type of waste has these details in the manual.

You can see details.

# Example

## ▶ 1.L01 Acidic Waste

### Meaning

Wastes With a pH lower than 7 and containing more than 5% mineral acids in the solution.

### Example

Sulfuric acid hydrochloric acid Waste from DO experiments.

### Storage

Store in containers in good condition. There is a tight cover made of PP or PE plastic.

### Treatment/Elimination

Neutralize If there is sediment, filter the waste water. then send the sludge to be disposed of.

## ▶ 4.L04 Phosphorus/Fluoride-containing waste

Meaning	Liquid waste containing phosphorus/fluoride.
Example	Hydrochloric acid Fluoride Compounds Silicon Fluoride Phosphoric Acid.
Storage	Store in containers in good condition. There is a tight cover made of PP or PE plastic.
Treatment/Elimination	Made in the form of calcium sludge/delivered to the disposal company.

## ▶ 5.L05 Wastes containing inorganic/organic cyanides

Meaning	Wastes containing cyanide complexes or cyanocomplexes.
Example	Sodium cyanide (NaCN), $(\text{Ni}(\text{CN})_4)^{2-}$ , $(\text{Cu}(\text{CN})_4)^{2-}$
Storage	Store in containers in good condition. There is a tight cover made of PP or PE plastic.
Treatment/Elimination	Send removal company.

## ▶ 16.L18 Flammable Waste

Meaning	Waste that can easily ignite which must be kept separate away from sources of fire such as heat, chemical reactions, flames, electrical appliances, plugs.
Example	Acetone, benzene, carbon disulfide, cyclohexane, diethylether, ethanol, methanol, methyl acetate, toluene, xylene, petroleum spirit.
Storage	Store in containers in good condition. The lid is completely made of PP or PE plastic.
Treatment/Elimination	Made in the form of calcium sludge./Send a company to dispose of.

## ▶ 17.L19 Wastes containing image stabilizers

Meaning	The waste that is the cleaning solution. which consists of harmful chemicals and organic substances.
Example	Dark room waste for photo washing which consists of silver and organic liquids.
Storage	Store in containers in good condition. There is a tight cover made of PP or PE plastic.
Treatment/Elimination	Send a company to dispose of.

The procedures and methods of classification and classification of wastes in the laboratory of The Center for Scientific and Technological Equipment are as follows:

1. Fill out the chemical record form. and hazardous wastes arising from experiments/tests/research Identify the components of the waste. Concentration and type of hazardous waste. (Form CSE-HZW-01)



2. Check the concentration of each chemical in the waste whether it exceeds the limit of the factory sewage control standard or not.



3. Identify the type of hazardous waste. according to the system of the Tool Center Only wastes with a concentration that exceeds the standard for sewage control from the factory only.



4. Make a list of wastes for the course of operation / research according to the list form of the course / research. (CSE-HZW-02)



5. Provide a container for the waste. Ready to make labels and stick on the container by type of waste. Place the waste container in the laboratory. for students to discard waste according to separate categories \*\*\*\*



6. Record the amount of waste in the laboratory in the waste volume record form, which is divided into 2 types.

- ▶ Form for recording the amount of liquid waste (CSE-HZW-03)
- ▶ Solid waste volume record form (CSE-HZW-04)



7. Collect the amount of laboratory waste and record the amount of waste in the laboratory waste quantity report form. (Form CSE-HZW-05) Send the head of the relevant department.



8. The head of the department checks the correctness and orderliness of the waste collection and signs the laboratory waste report form.



9. Submit a report on the quantity of laboratory waste in the laboratory according to the form (Form CSE-HZW-05) which the head of department has already signed to the central waste warehouse administrator of The Center for Scientific and Technological Equipment.



10. The laboratory allows employees to deliver waste to the central waste depot of The Center for Scientific and Technological Equipment. every Wednesday afternoon.



11. Collect the amount of waste from the laboratory waste quantity report form from all parties. by recording in the stock record the quantity of the central waste warehouse. (Form CSE-HZW-06)



12. Collect the total amount of waste sent to the central waste depot according to the record form for the amount of waste stored in the central waste depot of The Center for Scientific and Technological Equipment. (CSE-HZW-07) at the end of each semester or as appropriate.



13. Bring information on the amount of waste collected in the central waste warehouse to the management of The Center for Scientific and Technological Equipment. to request approval for the request for waste to be disposed of according to the procurement / hiring process of the university.

# Preparation of waste storage containers and equipment

- ➡ **Container for waste storage** : It should be a bucket or bottle with a fairly wide compartment made of PP or PE plastic and with a screw-on cap that closes tightly.
- ➡ **Loading waste into waste storage containers** : Waste should be contained no more than 70-80% of the container volume.
- ➡ **Waste storage facility within the laboratory** : Area separated from the operating area and in a well-ventilated area.

# A place used for waste storage

- ➡ **Building waste storage facility** : It should be the place on the bottom floor of the building. have good ventilation.
- ➡ **Waste collection facilities in central waste collection sites** : Must be a greenhouse or a large enough volume It is well ventilated and has different types of waste storage. properly according to standards and able to properly separate the collection of waste that cannot be combined with other types of waste.

# Label format and waste label writing example

ส่วนที่ 1 สำหรับติดด้านบนภาชนะใส่ของเสีย		<h2 style="text-align: center;">ของเสียที่เป็นสาร ปรอทอินทรีย์</h2>		
	แหล่งกำเนิดของเสีย/ชื่อ การทดลองที่ก่อให้เกิดของ เสีย/ค่าสำคัญ			
	<b>L08</b>	วันที่เริ่มบรรจุ	ชื่อห้องปฏิบัติการ	อาคาร
20/1/2559		ห้องปฏิบัติการเคมี 1-4	เครื่องมือฯ 7	
ของเสียอันตรายที่เป็นของเหลวประเภทที่ 08	วันที่หยุดการบรรจุ	ชื่อหน่วยงาน	โทร:	
รหัสฉลาก: <b>X-XX-XXXX</b>	20/3/2559	ฝ่ายห้องปฏิบัติการวิทยาศาสตร์ พื้นฐาน	3699	
ชื่อสารเคมีที่เป็นส่วนประกอบของเสีย	ปริมาณ (ลิตร)	หมายเหตุ	สำหรับผู้กรอกข้อมูล	
1. ของเสียจากการทดลองเรื่อง การวิเคราะห์หาปริมาณไขมัน	20		<i>ของเสีย อันตราย</i> (น.ส.ณัฏฐิรา รั้ววิเศษ)	
			สำหรับจนท.ห้องปฏิบัติการ	
			<i>กาญจจรรย์</i> (นางกาญจจรรย์ ว่องไวรัตนกุล)	
<b>รวม</b>	<b>20</b>			
<p>หากมีข้อสงสัยกรุณาติดต่อ : ศูนย์เครื่องมือวิทยาศาสตร์และเทคโนโลยี มหาวิทยาลัยวลัยลักษณ์ โทร 075-673-248-51 โทรสาร 075-67-3247</p>				





# Laboratory waste storage General

## Chemistry Laboratory (CHM-106)

No.	Parameter	Hazardous waste components	Waste Type
1	Solution Preparation	NaOH, H <sub>2</sub> SO <sub>4</sub> , HCl	keep for use Lab 2
2	Acid-Base Titration	NaKC <sub>8</sub> H <sub>4</sub> O <sub>4</sub> , NaCl, Na <sub>2</sub> SO <sub>4</sub>	Thoroughly check the pH and throw it into the pipe.
3	Recrystallization	sand, filter paper	S05
		crystal	keep for use
4	Precipitated Titration	AgCl <sub>2</sub>	L11
		butter solution	throw in the pipe
5	Finding the gas constant	NaHSO <sub>4</sub>	throw in the pipe
		NaNO <sub>2</sub>	L13
6	Properties of halogens and halides, part 1	Na <sub>2</sub> SO <sub>4</sub>	S05
	Properties of halogens and halides part 2	AgF, AgBr, AgI	L11
7	Kinetics : Part 1 and Part 2	H <sub>2</sub> SO <sub>4</sub>	L01
8	Every trial	broken glass	S02

Note : Please separate and record the amount of each waste in the form after each experiment.

# 1. Chemistry Laboratory 4



# Storage of liquid hazardous waste

1. Wear protective clothing and personal protective equipment (PPE).



2. Classify waste by subjects.



3. Pour the waste into the beaker.



4. Record the information in the waste quantity record form.



5. Pour the waste from the beaker through the funnel into the hopper labeled with the type of waste.



# Storage of hazardous solid wastes

1. Wear protective clothing and personal protective equipment (PPE).



2. Classify waste by subjects.



3. Weigh the tank before disposing of the waste and saving.



4. Dispose of waste into bins labeled with the type of waste.



5. Weigh the tank at the end of the operation.



6. Record the information in the waste quantity record form.

