



ICMS 6F Quality Control (Analytical Chemistry) Laboratory

ICMS Laboratory Safety Committee
6F Technician Office: N22-6029
6F Trainee Office: N22-6031

OUTLINE

1. Common Small Equipment
2. Delicate Instruments
3. Chargeable Delicate Instruments
4. Training and Maintenance
5. About Lab Environment



ICMS_6F



PART I

N22-6F Lab Common Small Equipment



01 Vacuum Drying Oven



N22-6001

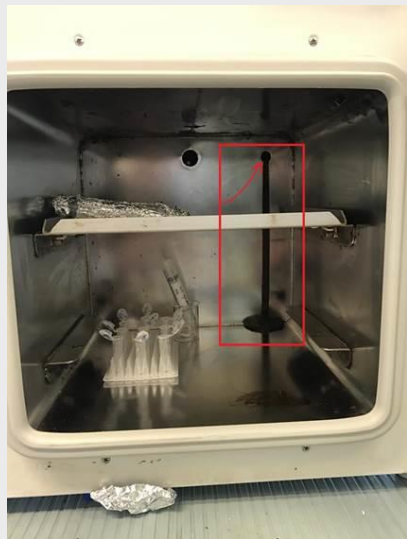


1. Pay attention to the fire/combustion point, autoignition temperature, and boiling point of the solvents in your sample
2. Must cover your sample containers with lids or appropriate protection to avoid contaminating the interior of the oven
3. Never stacking too much items
4. Clean up the interior after use
5. If any waste produced, please collect them separately to 6027/6028 waste room

01 Vacuum Drying Oven



N22-6001



廢液



02 Freeze Drying Machine



N22-6001



1. Never freeze drying “non-aqueous” and “volatile organic solvent” samples
2. Use aluminum foils to cover your sample container, punched with needle for vacuuming. Used needles should be stored or disposed appropriately and never just put on the bench
3. Recycled aluminum foils should be stored or disposed appropriately.
4. Clean the glass bottles before you return to the lab technician office
5. The machine will be regularly shut down for defrosting.

How to use the Drying Equipment



Pay ATTENTION to all the Vacuum Drying Ovens and Freeze Drying Machines before and after you used, clean up the machine and lab environment!

01

Borrow the glass bottles for freeze dryers at 6031 office from our helpers, register at logbooks and loan records
(The glass bottle loan period DOES NOT EXCEED 1 MONTH)

02

Follow strictly to the regulations of usage
LABEL clearly with your NAMES/PI (No initials please, e.g. YTW? XC? otherwise no one knows whose sample is it)

03

Clean up the lab benches after use.
No USED foils, needles, etc. on the benches, please store/dispose properly
NEEDLES > yellow SHARP BOX

If any unknown and unidentified samples or harmful substances are found, lab technicians are entitled to pursue

03 Nitrogen Evaporator



N22-6005a, 6041a



1. Blowing needle tips MUST be 6mm HIGHER than the liquid level of the sample
2. Gas Output <30 psi
3. Water bath temperature 60-75°C
4. Replace water inside the bath regularly (Millipore water)
5. No Acid/Alkaline samples
6. Never remove the blowing needles for other use
7. If there is any liquid leaking, please clean it up yourself

04 Sonicators



N22-6002-02, 6009a



1. Water bath never exceed 60°C
2. Adjust water in the bath for the sonicating containers with size
3. Liquid level in the bath should be higher than liquid level in the sample/solvent containers
4. Add/Replace water in the bath (Millipore) and clean the bath up regularly
5. Never close the bottle lids too tightly or too loose

05 Drying Oven



N22- 6002, 6009a



1. Never heat over 70°C, especially with TCM herbs
2. Regularly check your cleaned glassware or containers, never put inside the oven over 2 hours or even for overnight
3. Never put combustible, explosive, volatile, corrosive substances in the oven

06 Analytical Balances



N22-6006



1. Clean up the balances and the bench BEFORE and AFTER USE
2. No dirts
3. Close all the lids when finished weighing

07 Centrifuges



N22-6009a ,6041a



1. Keep the weight balanced with the opposite side. Be careful of the sample **weight**, not volume (because of density)
2. Keep the weight balanced for the rotors, close the lids of rotors and machine properly
3. Leave with the machine lids opened after use, to evaporate the condensed water because the centrifuges can be set up at low temperature

08 Rotavaps



N22-6013b



1. Read carefully the MSDS of all the solvents before use
2. Inform lab technicians if you are rotavaping toxic, irritating, heavy-odor substances, and wear appropriate PPE during use. Ventilation MUST be considered
3. Make use there is enough water in the water bath
4. Handle carefully with all the glassware
5. Never put over 50% by volume of your initial distilling flask, to avoid sucking back during vacuuming
6. Pay attention to the solvent collecting flask
7. Clean up the water bath regularly

09 FTIR



N22-6013a



Thermo Fisher
Nicolet iS 10 FTIR



Perkinelmer-spectrum-100
FTIR

1. Only for **solid samples**, KBr salt pressing method
2. Borrow the pressing kit from 6031 office (<7 days) (The pressing kit attaches a detailed list of containing tools. Check the quantity of the tools and KBr. You must return the pressing kit in good condition, cleaned with water and ethanol and dry properly)
3. You can just standby the instrument after use. It' s no need to shut down the power.
4. Complete the use record logbook everytime after use

10 Purified Water Sources



N22-6002-02, 6009a

1. Be careful of the water dispensers
2. Read the screen and take the water when 18.2 MΩ.cm, 5 ppb TOC or below
3. Dispensing speed is adjustable



Manual Dispensing

To start dispensing in drop-by-drop, turn the dispense wheel one notch counter-clockwise.

To start dispensing at full flow, press down on the wheel.



Adjust flow rate

To increase the flow rate keep turning the wheel counter-clockwise until full flow is reached. To decrease the flow rate, turn the wheel clockwise.

Drop-by-drop          Full flow



Stop

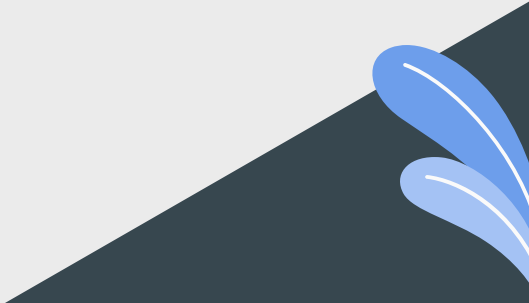
To stop any ongoing dispensing, press down on the wheel or rotate the wheel clockwise until no more water flows from the dispenser.





PART II

N22-6F Delicate Instruments



Liquid Chromatography 01



N22-6005a, 6017, 6036



User must pass the training and examination to get these instruments' licences



Agilent HPLC



Waters HPLC



Dionex UHPLC



Shimadzu HPLC

Liquid Chromatography

01 Sample prep.

- ① Sample must be purified to remove impurities, precipitations to avoid signal weakening, or contaminating/damaging autosampler needle, column and mass spectrometer
- ② Be careful to use good quality of vials, screwcaps, septa.

02 Mobile phase

- ① Use analytical grade and MS grade solvents
- ② Ultrasonicate/degas all solvents at least 15 mins
- ③ Filter all solvents with appropriate filters
- ④ Freshly prepare all the mobile phase (aqueous <3d, organic <7d)

03 Before Run

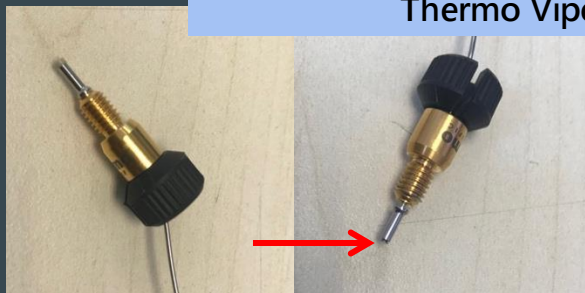
- ① Fill up WASH, PURGE solvents
- ② Clear the WASTE bottle
- ③ Check hardware connections
- ④ Carefully install the column
- ⑤ Column wash and equilibrium

04 After Run

- ① Wash the whole system with Blank samples a few times after a sequence run
- ② Close UV and Vis Lamp for DAD detector
- ③ Clean up the benches and collect back the sample vials
- ④ BACKUP all your method and data regularly

Liquid Chromatography

Thermo Viper



Hand screwed vipers (damaged, right)
Users must compensate for improper use

Clear all solvent bottles
and waste bottle



Organic solvent waste > 6028 room
Empty glass bottles > 6027 room

Non-hand screwed tubing

柱温箱以及APH预加热器



APH预加热器在拆卸时, 注意左侧接头, 用手即可拧紧, 一般不需要借助工具, 在线过滤器与色谱柱连接时, 先用手拧紧, 再使用工具紧1/8~1/4即可, 一般先将色谱柱与在线过滤器先做连接, 再与APH连接, 最后连接色谱柱出口。

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Tightening/Loosening carefully with spanners
Screw with spanner by 1/8 turns and be careful not too tight

Gas Chromatography 02



N22-6037a



User must pass the training and examination to get these instruments' licences



Thermo ISQ GC-MS

1. Consult and borrow the tools and parts from lab technicians
2. Liquid or headspace sampling
3. GC-MS
4. Check regularly gas cylinders and vacuum pumps conditions, report to technicians if abnormality

High Performance Thin Layer Chromatography 03



N22-6005a



User must pass the training and examination to get these instruments' licences



CAMAG HPTLC

1. TLC plate and solvents must be prepared by user
2. Pre-opened sample bottles must be used to avoid damaging the sampling needle
3. Sample must be diluted by solvents, any precipitation/sticky substance is not allowed to be injected in HPTLC. User will be liable to the damage of the sampling needle.

PART III

N22-6F

Chargeable Delicate Instruments



01 High Resolution Mass Spectrometers

User must pass the training and examination to get these instruments' licences



N22-6037a



線性離子阱組合
靜電場軌道阱質譜儀
Thermo LTQ Orbitrap
XL Mass Spectrometer



N22-6037a



超高效液相及氣相色譜
高分辨離子淌度質譜儀
Waters SYNAPT G2-Si High
Definition Mass Spectrometer



N22-6013a



感應耦合電漿質譜分析儀
Thermo iCAP Qs Inductively
Coupled Plasma Mass
Spectrometer

01 High Resolution Mass Spectrometers



Read carefully on ICMS website for regulations

<https://sklqrcm.um.edu.mo/instrument-reservation-training-maintenance/>

UNIVERSIDADE DE MACAU
UNIVERSITY OF MACAU

SKLQRCM-UM
中藥質量研究國家重點實驗室 (澳門大學)
Laboratório de Referência do Estado para Investigação de
Qualidade em Medicina Chinesa (Universidade de Macau)
State Key Laboratory of Quality Research in Chinese Medicine
(University of Macau)

中華醫藥研究院
Instituto de Ciências Médicas Chinesas
Institute of Chinese Medical Sciences

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Home

Instrument Reservation | Training | Maintenance

- + 實驗室常規設備需知
- + 實驗室常規儀器使用相關 Instrument Reservations / Training / Maintenance
- + 6F 高分辨質譜使用辦法 Reservation for High-Definition Mass Spectrometers
- + N22-G013 NMR 核磁共振光譜儀使用辦法

***There are more strict and detailed regulations on operating the HRMS

HRMS

- *00** Each PI group is only allowed to recommend 1~2 group PhD student (only, no MSc) to apply for HRMS user licence.
- *01** Users can only apply for training HRMS after acquired UPLC/HPLC licences at least 6 months
- 02** Door access control is granted after examination passed and licence granted
- 03** Strictly follow LIMS reservation regulations, and agreed by your PI supervisor before use
- 04** The related instruments are charged with a price rate by 0.5 hr minimum
- 05** For infrequent demands, it is recommended to pass the samples to the licensed users or other licensed PI group member (with PI collaborations)



- **Never book the instrument for others**
- **The one who reserved the instrument bare all responsibilities**
- **Time adjustment between reservations is allowed, please inform technician ASAP.**

***The user will be liable for any damages caused by improper use**

02 NMR



N22-G013



NMR testing service is done by technicians.

Sample preparation and regulations can be found:

<https://sklqrcm.um.edu.mo/instrument-reservation-training-maintenance/>



**Bruker NMR 600MHz 核
磁共振波譜儀**

Home

Instrument Reservation | Training | Maintenance

+ 實驗室常規設備需知

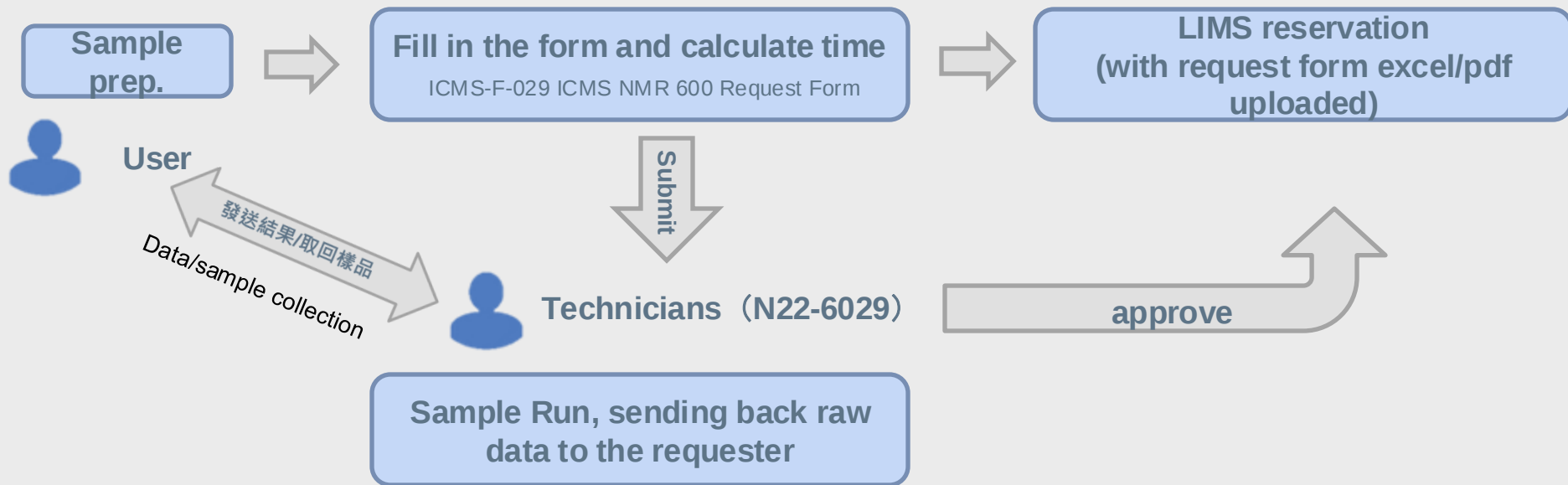
+ 實驗室儀器預約/培訓/報修

+ 高分辨質譜使用辦法

- N22-G013 NMR 核磁共振光譜儀使用辦法

1. 請依照NMR對樣品製備要求，準備好樣本 "[NMR對樣品製備要求](#)"
2. 填寫預約單Service Request Form [ICMS-F-029 ICMS NMR 600 Request Form](#)  **NEW!**，由表格自動計算好預計打譜時間，
3. 於LMIS系統上按照預算時間，點選預約 (同時並上傳Service Request Form之電子檔 .xlsx 或 .pdf，半小時為最低單位)
4. 每次預約，樣本按提交的預約單打譜，如要增加樣本，請及時告知技術員。使用者應自行考慮提交的樣品數量或／及打譜掃描
5. 樣本和Service Request Form紙本，交到6029辦公室處

02 NMR



02 NMR



6029 sample
submission
With samples,
hard copy request form

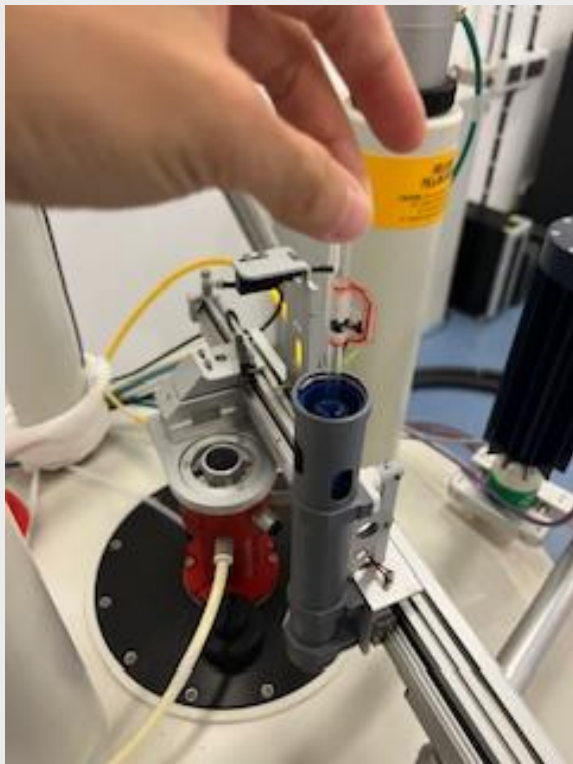
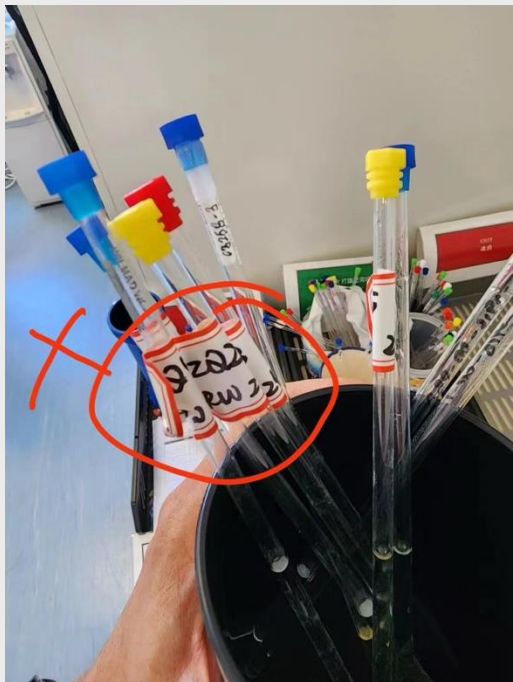
At Left box



Finished samples
Collect back your samples ASAP
Technicians will dispose all uncollected
samples every Friday

At Right box

02 NMR



Be careful of the labels!

No thick/long labels

No thick parafilms

02 NMR



Sample preparation follows “NMR對樣品製備要求 ” for better results of NMR spectra



State clearly the sample names (each PI group has an initials), spectrum type, solvents, NS number, SW, O1P, etc.



Be careful of the sample liquid level, no too big, thick labels on NMR tubes and no too thick parafilms and foils to interrupt the spinner



Never get the first try with too many NS scan time, especially for 2D spectra, because of the resolution is not necessarily improved if your sample concentration is too low or the condition is too bad.

02 NMR



Pay attention to fill in necessary information and parameters

600 MHz NMR Service Request Form
Institute of Chinese Medical Sciences
University of Macau

請確保郵箱內空間充足, 以便發送打譜數據
也可加入微信, 數據會直接打包發送給申請者

FULL Name: _____ **Supervisor:** _____ 核磁打譜需收費, 請注明所屬課題組。
Email: _____ **Phone:** _____ 打譜前應與課題組主持人商量知悉 **Date:** _____

(If the Experiments are not listed, please contact lab technician at samueltam@um.edu.mo for details)
Fill in the red highlighted columns, add the row by yourself if you have more samples
Copy the default NS (scan time) to Column H if you use the default

Sample Lot #	Sample ID	Solvent	Molecular Weight	Experiment	Number of Scans (NS by default)	Duration (seconds/default NS)	Number of Scans (designed NS)	Duration (seconds/designed NS)	Duration (minutes/designed NS)	Remarks (such as values of SW, OP, P1, etc.)	
1		DMSO		H	8	40	32	160	2.66666667	此欄標註其他打譜要求 例如改動SW, O1P等	
				C	64	210	64	210	3.5		
				DEPT135	32	150	32	150	2.5		
				WATERSUP	8	60	32	240	4		
2		CDCl3		H	8	40	16	80	1.33333333	表格公式自動計算 打譜時間, 請勿改動	
3		D2O		H	8	40	8	40	0.66666667	不需改掃描次數的話, 請把左邊 默認值拷到此欄	
				Total		1840	30.67	0.51			
						(in seconds)	(in minutes)	(in hours)			

選打何譜
WATERSUP=壓水峰氣譜

所有樣品打譜時間的總和估算, 請按此時間在LMIS系統預約
預約時上傳此表格電子檔, 提交樣品時也需要附上紙本表格

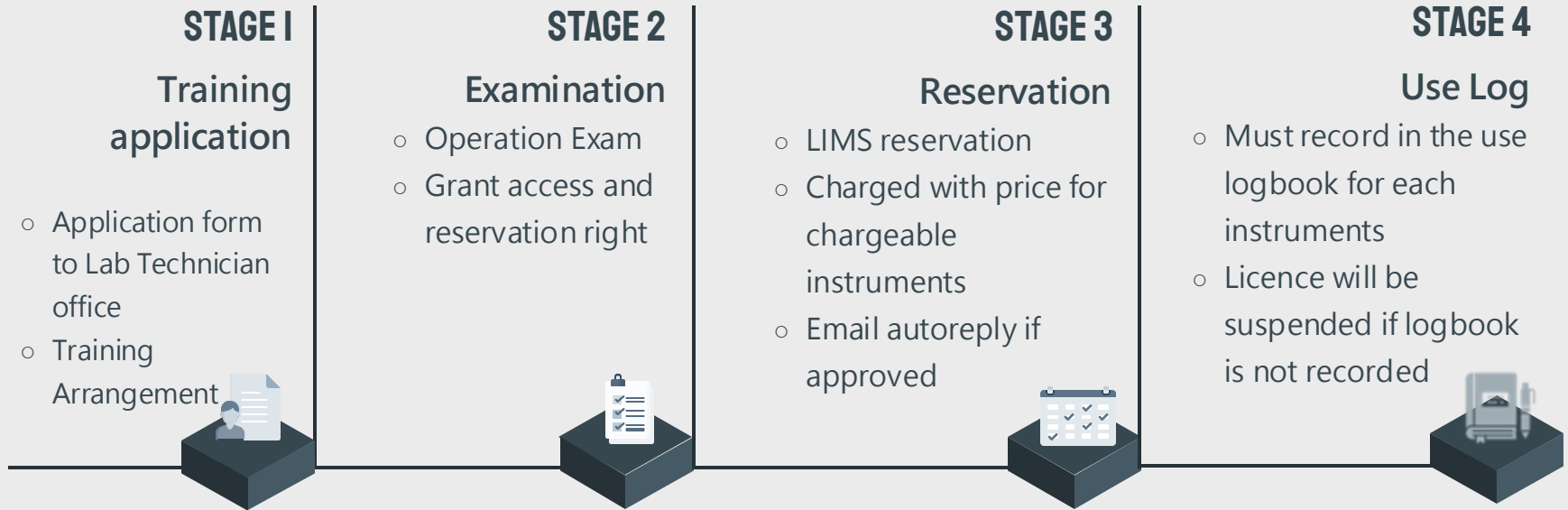


PART IV

Training and Maintenance



Procedures



Requester Information			
Name	陳大文	Student No.	mb912345
E-mail	mb912345@um.edu.mo	Ext.	61234567
Office	6F-6001	P.I.	Prof. YTWang
Form Number (For internal use)			
Instrument Information			
Instrument Name	Agilent HPLC		
Model	1100 Series		
Internal No.	Agilent 01		
Location	N22-6005		
Justification			
Using HPLC to detect the concentration of the extracted compound. UV absorption is used for detection so DAD is required.			
Signature			
Date: _____ Applicant Date: _____ Instrument Assistant Date: _____ Lab Technician			

Fill in by lab technician			
Application Received Date			
Training Person		Email	
Training Date		Training Time	
Examining Date		Examining Time	
Examination Result			
Follow-up			

備註：

- 申請者在使用實驗室內任何儀器前需經由培訓及通過考核方可獨立操作；
- 申請者需將表格交到技術員辦公室，由技術員安排培訓及考核時間，並會以電郵形式確認；
- 部分儀器由研究助理或儀器負責人幫忙培訓，但仍係由技術員進行考核；
- 考核通過後按儀器預設的程序進行預向，部分儀器採用紙本預向形式，部分收費儀器則採用 LIMS 系統預向，詳細情況請向技術員查詢，未得批准前禁止擅自使用儀器。

Form

Training and Examination Application Form

Download at ICMS website

Instrument Training and Examination Application

Training Arrangement by Technicians

Status 不要只填 OK，應填寫儀器使用參數條件、檢測器、樣品資料等，多謝合作！

Unit:	ICMS
Name of Equipment:	Dionex Ultimate 3000 Rapid Separation liquid Chromatography with DAD & FLD
Brand and Model:	Thermo Fisher Dionex Ultimate 3000
UM Asset Number:	
Person-in-Charge:	Sherry Wong
Location:	N22-6017
Initial Usage Date:	2021-11-15
Initial Training Date:	
Other Remarks:	

Academic Equipment

[illegible]

Usage Log

[illegible]



UNIVERSIDADE DE MACAU
UNIVERSITY OF MACAU

Instrument Maintenance Request 儀器故障報告及維修申請表

(申請人請先參閱備註之重要事項，填寫表格後交到實驗室技術員處。)

Requester Information				
Submit Date	2019/09/01		Form Number (For internal use)	
Name	陳大文	P.I.		Prof. YTWang
Student No.	mb912345	Tel./Ext.		61234567
E-mail	mb912345@um.edu.mo			
Instrument Information				
Instrument Name	Agilent HPLC			
Model	1100 Series			
Internal No. (e.g.: Agilent 91)	Agilent 01			
Location	6005			
Fault Description 故障描述				
Date	2019/08/31	Time	11:30 am	
Problem	(請詳細描述儀器使用時出現什麼問題) 在進行序列跑樣時，出現柱壓不穩，尤其在使用A通道時會出現較大波動			
Reason	(如知道，請詳細描述故障原因)			
Troubleshooting Process	(如曾自行嘗試解決上述故障情況，請詳細描述) 嘗試以有機相沖洗系統三小時，但仍然未能解決柱壓問題，亦試過用其他色譜柱但仍是會出現相同問題。			
Remark	(如有其他寶貴觀察，請註明) 發現有時六通閥位置會漏液，但不是持續地漏液。			
Signature				
Date: _____ Applicant Date: _____ Instrument Assistant Date: _____ Lab Technician				

備註：

- 實驗室使用者在使用儀器時如出現任何故障情況請即向儀器負責人及技術員報告，再填寫此表格作維修申請；
- 在非辦公時間內出現儀器故障情況時，使用者切勿自行拆卸儀器組件；
- 如曾自行嘗試解決故障情況，請詳述其過程，並向技術員作書面及口頭報告；
- 技術員在收到維修申請表後，會視乎情況作出維修安排，並以電郵通知報告者維修情況及進度。

Maintenance

Instrument Maintenance Request

- Severe damage never handled by yourself
- Fill in the form and submit to lab technician office by hard-copy form and/or email (with the format of the request form), no ORAL report
- Describe carefully the problem, error message on software, troubleshooting procedures, etc.
- If repair service is needed to be purchased, please be patient because of the budget availability is limited and procurement procedures is long

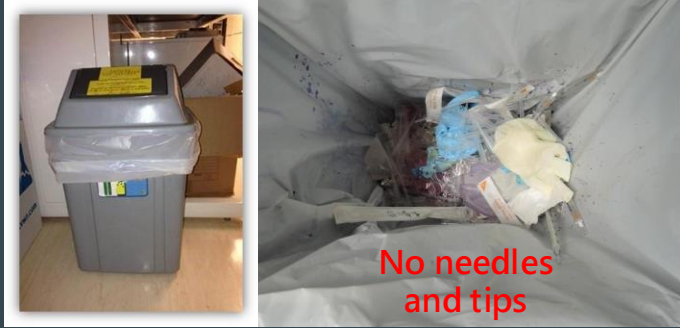


PART V

About Lab Environment



01 Waste Categorising



General waste : No dangerous solid items



Solid Chemical Waste :
Contaminated gloves and others, Sample Vials/Tubes, Pipette Tips, Wipe papers, etc.

01 Waste Categorising



Solid and Liquid Waste
MUST NOT be disposed in
the same container.

Solid > 6027

Liquid > 6028



Broken glass

No other rubbish, gloves at broken glass boxes

02 Waste

 N22-6028



Organic Solvent Waste

1. Use funnels, be careful of the barrel caps
2. NEVER fill up over 70% (45L) by volume, put the FULL label on the barrel
3. Never use SPARE barrels at the room
4. Only use the barrels inside the hood, close the hood doors after disposing waste

Acid, Alkaline, Heavy-metal, Waste Oils, other liquids (packed separately)

1. DG waste labels
2. Packed separately
3. At the corresponding shelf

03 Solvent Carrying Baskets

There is plastic carrying baskets in the lab for transferring one chemical bottle to another room. For safety matter please don't forget to use them.



This is not a Rubbish Bin!

04 Fume Hoods



Keep the door closed

N22 building ventilation is overwhelming, so that please close the door after use, to maintain the negative pressure in the hood.



Fume hoods are public areas **Please clear all your own stuff after use**

05 LC/LCMS



Clean up the bench

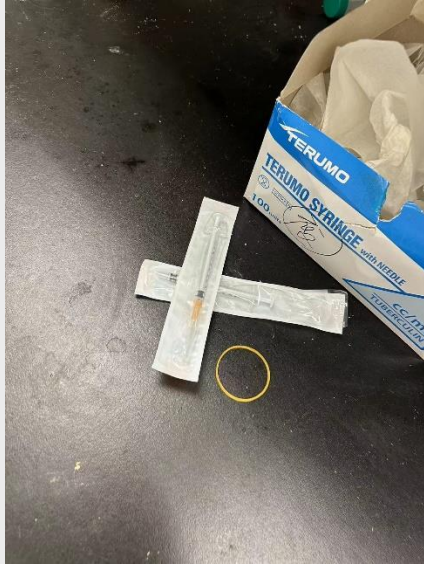
- Clear all the solvent bottles
- Clear all the sample vials
- Clear all the column and parts



Check Waste Bottle

- Secondary stainless steel container with the waste bottle.
- Check if they are full, dispose at 6028

05 Lab bench



Used/Waste needle tips to Sharp Boxes

- Re-usable needles should be packed and stored properly. Never just put on the bench.

05 Lab Bench



Clear the sink area

05 Lab Area



Never Drink and Eat

Lab area is dangerous and full of chemicals, please don't drink and eat.



Use UK style power cords

Lab equipment with other style power cords
Report at CMMS system to replace the plug

05 Lab Environment



No chemicals on the floor

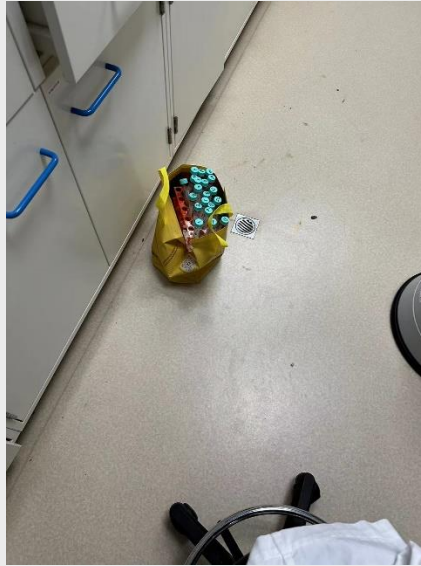
Should be stored at
cabinets



No chemicals higher than eye level

If you put too high, it is dangerous if the
item is fallen down

05 Lab Environment



Please don't put items on the floor, please!

05 Lab Environment



Broken Glass is sharp

It is dangerous to use the broken glassware, please dispose



Clean the labware immediately

Like your kitchen at home!
No Janitors and Technicians clean your stuff

05 Lab Environment



Door Access Control

Please bring your card to open the doors
Never use item to stuck the doors

05 Lab Chemicals



(第三十八條第一款所指者)

一般隔離規定

類別		第2類	第3類	第4.1類 易燃固體物質、自反應物質和遇水爆炸物質	第4.2類 易自燃物質	第4.3類 遇水放出易燃氣體的物質	第5.1類 助燃物質 (氧化劑)	第5.2類 有機過氧化物	第6.1類 有毒物質	第8類 腐蝕性物質	第9類 雜項危險物質和物品
	氣體	氣體	易燃液體物質								
第2類	氣體	○									
第3類	易燃液體物質	×	○								
第4.1類	易燃固體物質、自反應物質和遇水爆炸物質	×	×	○							
第4.2類	易自燃物質	×	×	△	○						
第4.3類	遇水放出易燃氣體的物質	×	×	○	△	○					
第5.1類	助燃物質 (氧化劑)	×	×	△	×	×	○				
第5.2類	有機過氧化物	×	×	×	×	×	×	○			
第6.1類	有毒物質	×	×	○	△	○	△	△	○		
第8類	腐蝕性物質	×	×	△	△	△	×	×	○	●	
第9類	雜項危險物質和物品	×	×	○	○	○	○	○	○	○	○

註：

- 原則上可混合儲存。
- × 不得混合儲存，應隔開儲存。
- △ 應遠離儲存。
- 易燃氣體、毒性氣體、氧化性氣體三者應隔開儲存。
- 酸性與鹼性物質應隔開儲存。



Be careful of the compatibility of chemicals
Follow Macau Laws and Regulations

05 Lab Environment



Good Examples



Infrequent use items in storage boxes



Tidy up the environment for better and safe use

05 Lab Environment



Freezer never put DG chemicals

Should also stocktaking your allocated fridge/freezer

Never put DG chemicals, and store the liquid and solid in separate area

Thanks for your attention

Lab tech Office: N22-6029

Office Hour: Mon-Thurs 09:00-13:00 14:30-17:45

Fri 09:00-13:00 14:30-17:30