

Quanta FE-SEM User Manual(Eng.)

울산과학기술원 연구지원본부 기기분석실
UNIST Central Research Facilities
UNIST Materials Characterization Lab

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UCRF

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Web. <http://ucrf.unist.ac.kr>

Lab Safety

Compliance with lab safety rules

If you do not follow the lab safety rules, access and use of the lab will be restricted, so we ask for your cooperation.



No Food or Drink



Wear Protective Clothes



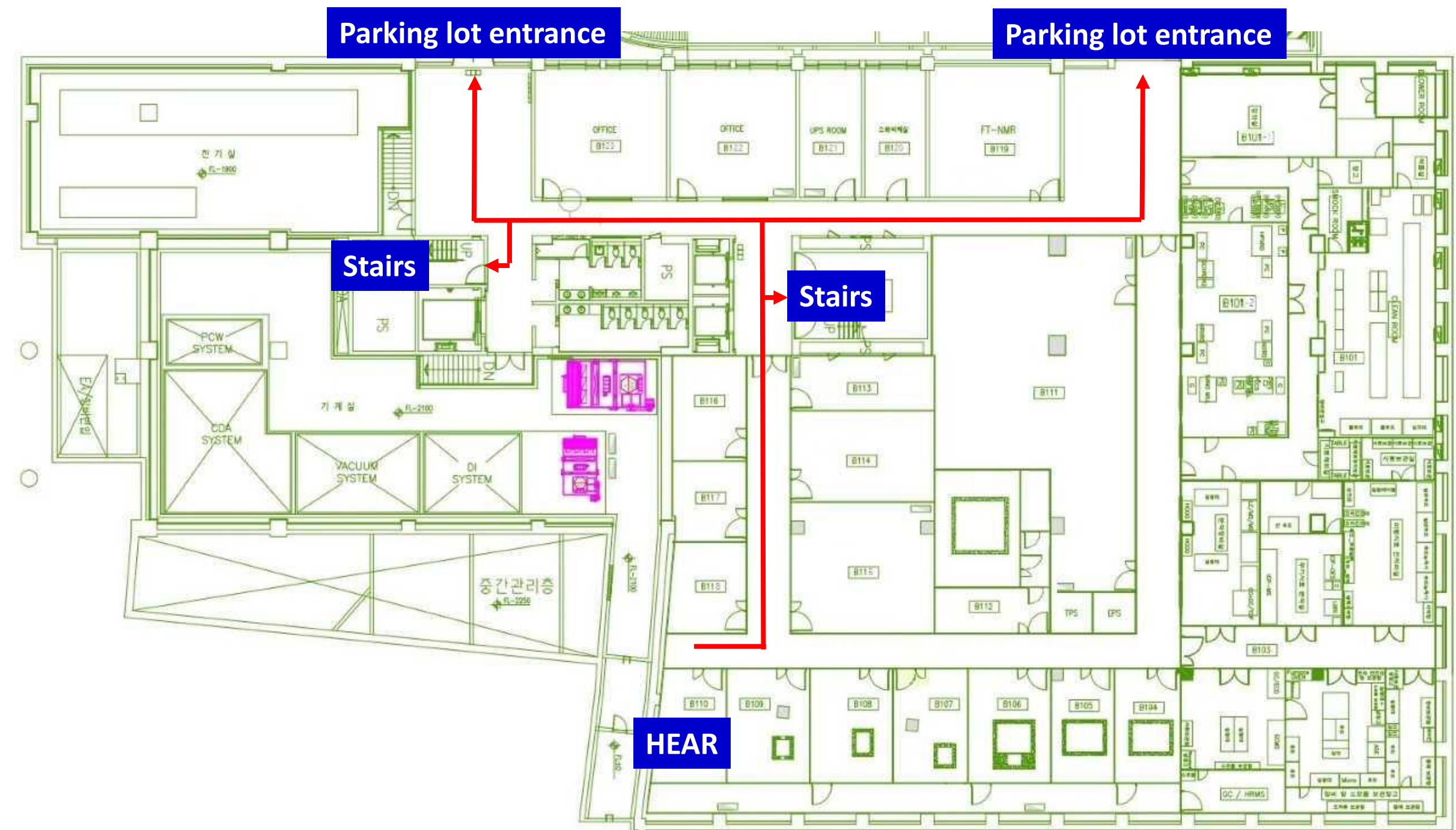
Wear Foot Protection
No Open-Toe Shoes

If you didn't bring your lab coat, please wear a shared lab coat entrance side of the room 101-2 on the first basement floor of 102 building.

Make sure to wear a lab coat and enter the lab of UCRF.

Make sure to keep the lab clothes you wore in their original place.

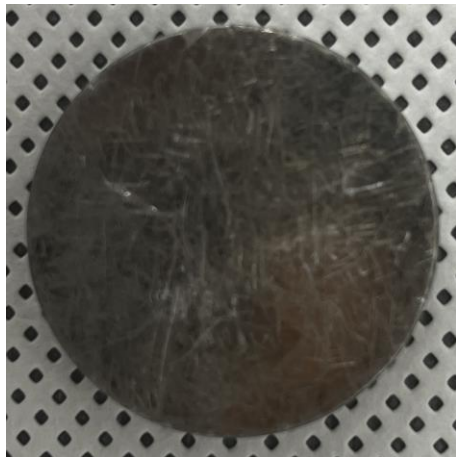



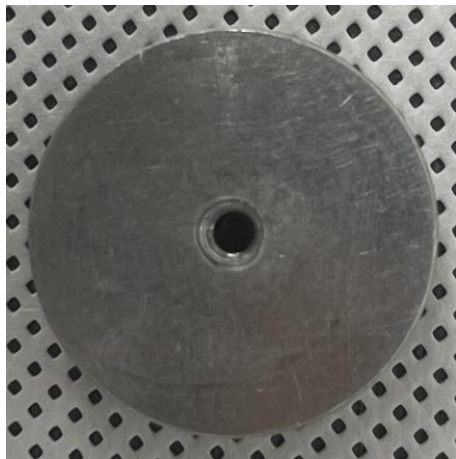
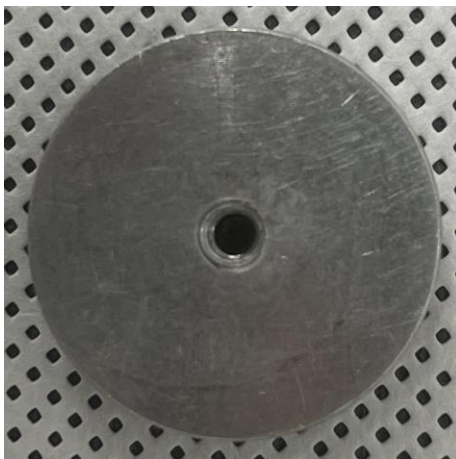


Lab emergency evacuation



UCRF SEM Feature

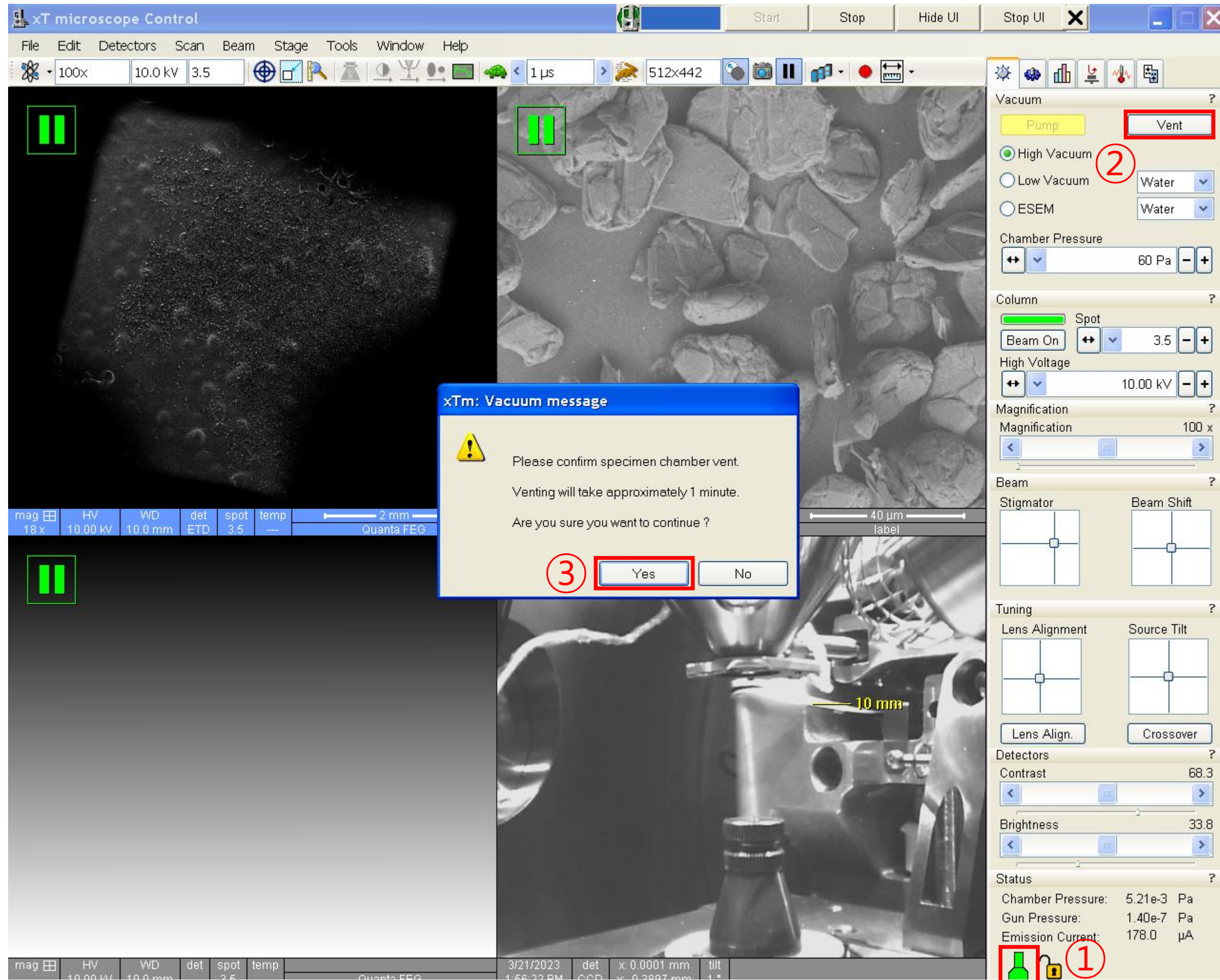
	High resolution imaging	EDS analysis	Specimen damage & charge-up	BSE detector	E-SEM	Reservation status	Introduction year	Fee(100%)
SU8220 cold FE-SEM	⊙	O	Slight	X	X	Busy	2013	40,710won /30min
SU7000 FE-SEM	O	⊙	Serious	X	X	Busy	2021	40,710won /30min
Cold FE-SEM	O	O	Slight	X	X	Not busy	2011	31,320won /30min
Nano230 FE-SEM	△	△	Slight	X	X	Not busy	2009	26,100won /30min
Quanta200 FE-SEM	X	△	Slight	○	○	Not busy	2009	26,100won /30min

SEM stubs

Type	A	B	C	D
Equipment	SU8220 Cold FE-SEM SU7000 FE-SEM Cold FE-SEM		Nano FE-SEM Quanta FE-SEM	
Usage	General	Cross section	General	Cross section
Picture (Front)				
Picture (Back)				

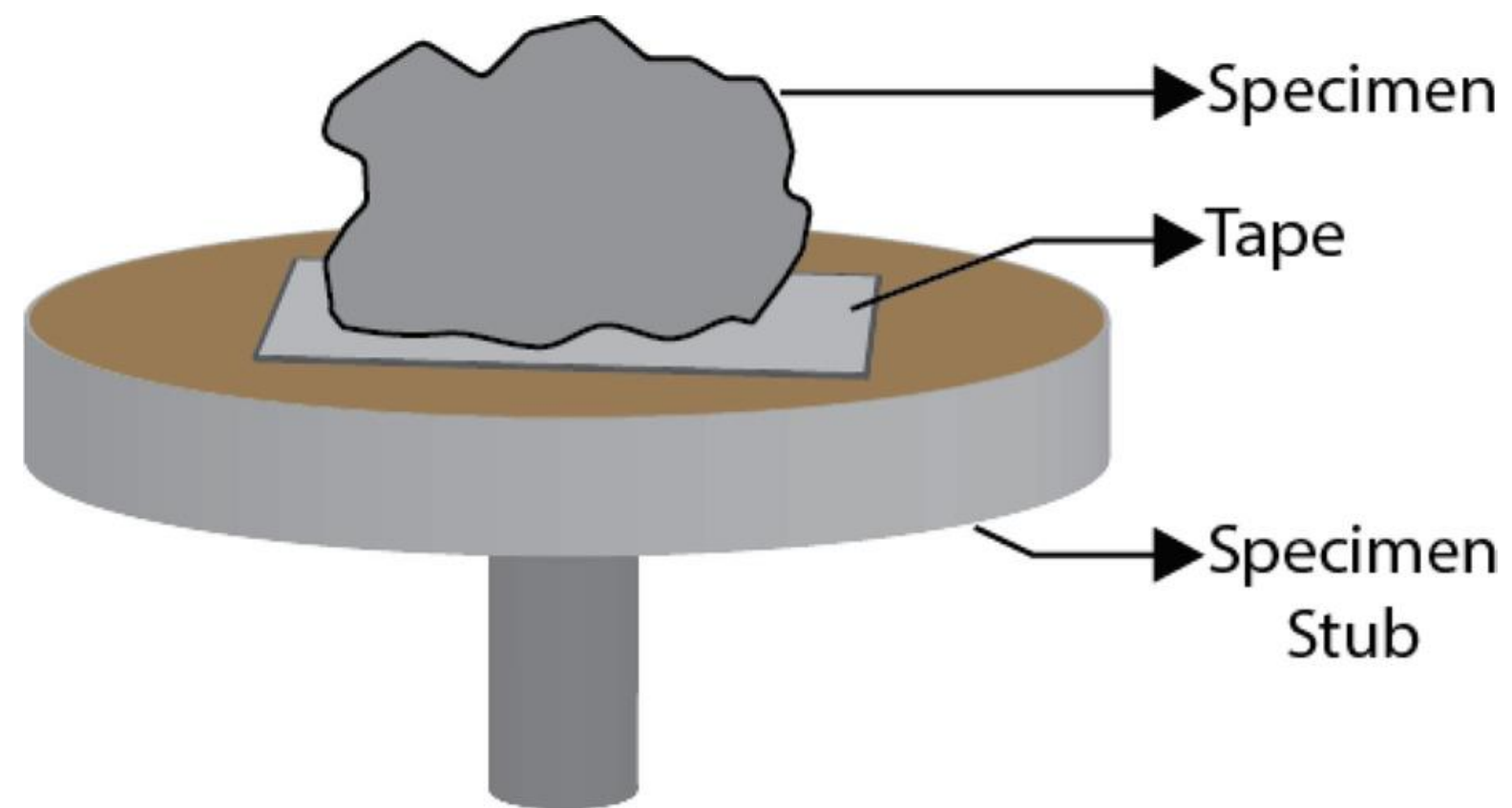
- If you need a special stub other than the stub above, please discuss with the SEM manager and UDMC.
- ☎ SEM stub Production: UDMC Cha Jae-hoon(cjh614@unist.ac.kr, 4069), Jeong Woo-hyun(print102@unist.ac.kr, 4176)

Starting Instrument



1. Check the vacuum state.(green)
2. Click [Vent].
3. Click [Yes].
4. Prepare the specimen until chamber part becomes **dark gray**.

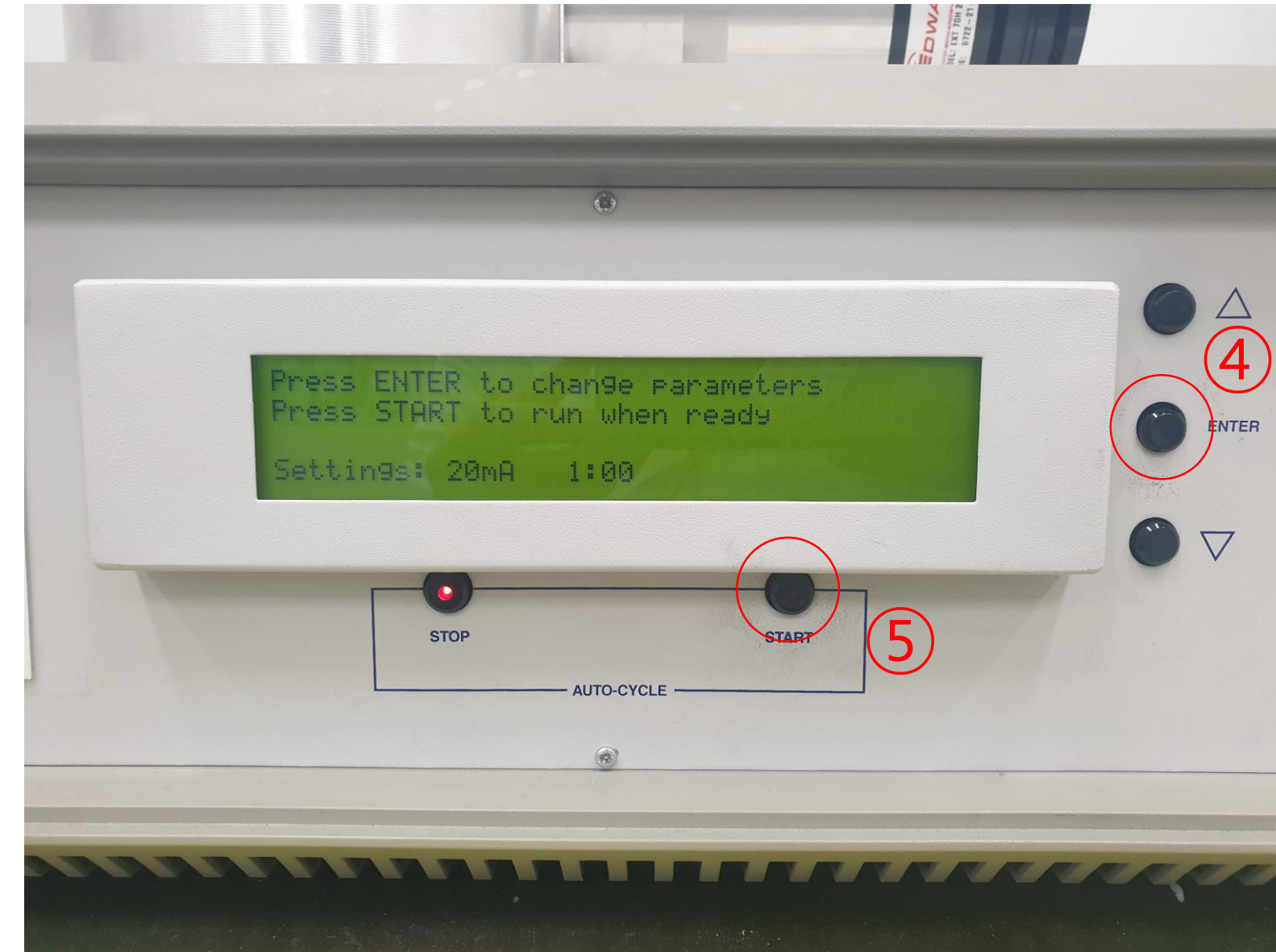
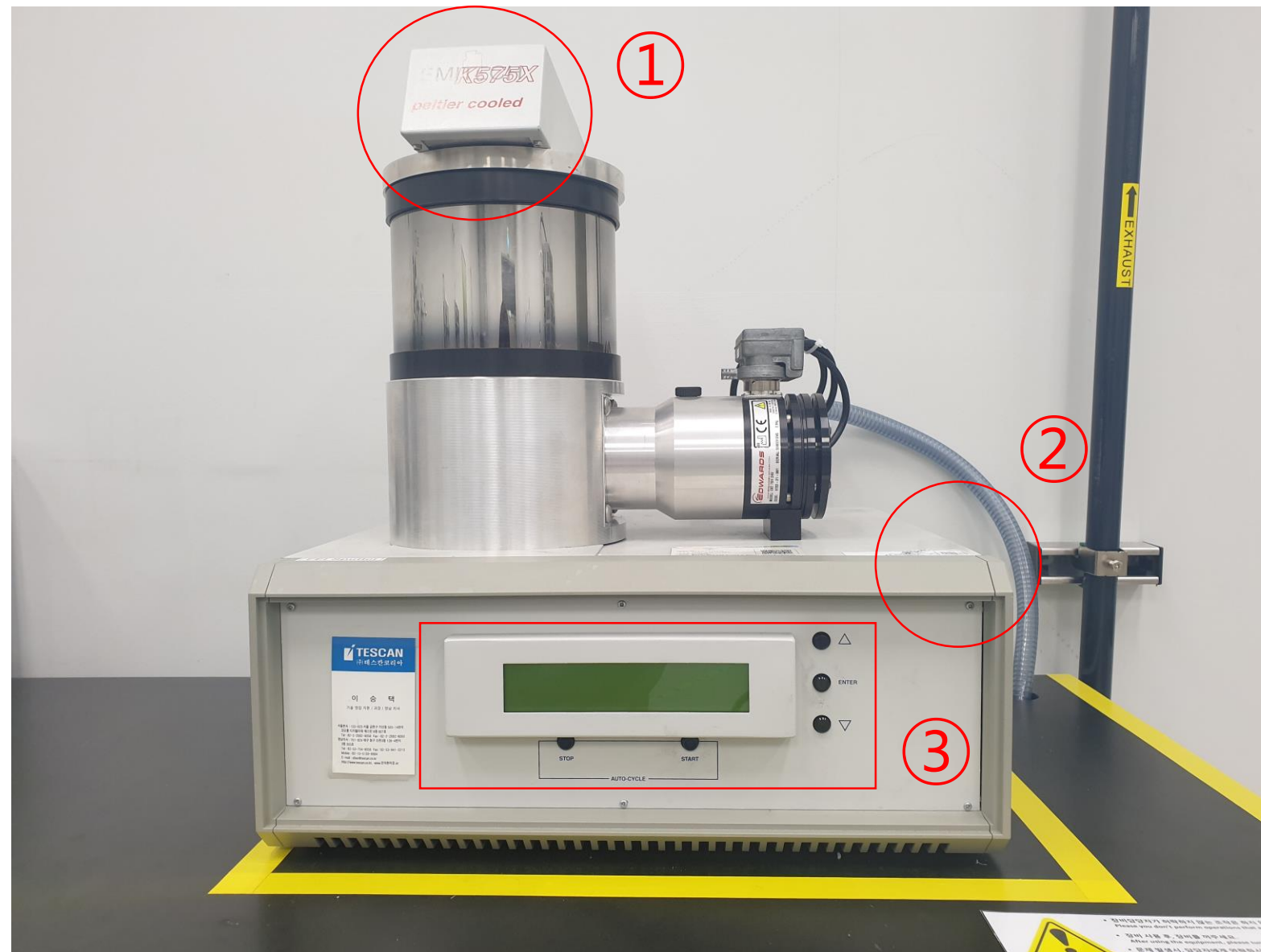
Specimen Preparation



1. Wear appropriate safety gear.(goggles, gloves, etc.)★
2. Prepare completely dried specimens.
3. Fix a very small amount of specimen using tape to individual stubs.(Use carbon tape for powder)★
4. Blow to remove dust from the specimen.★
5. Coat it if necessary.

Coating

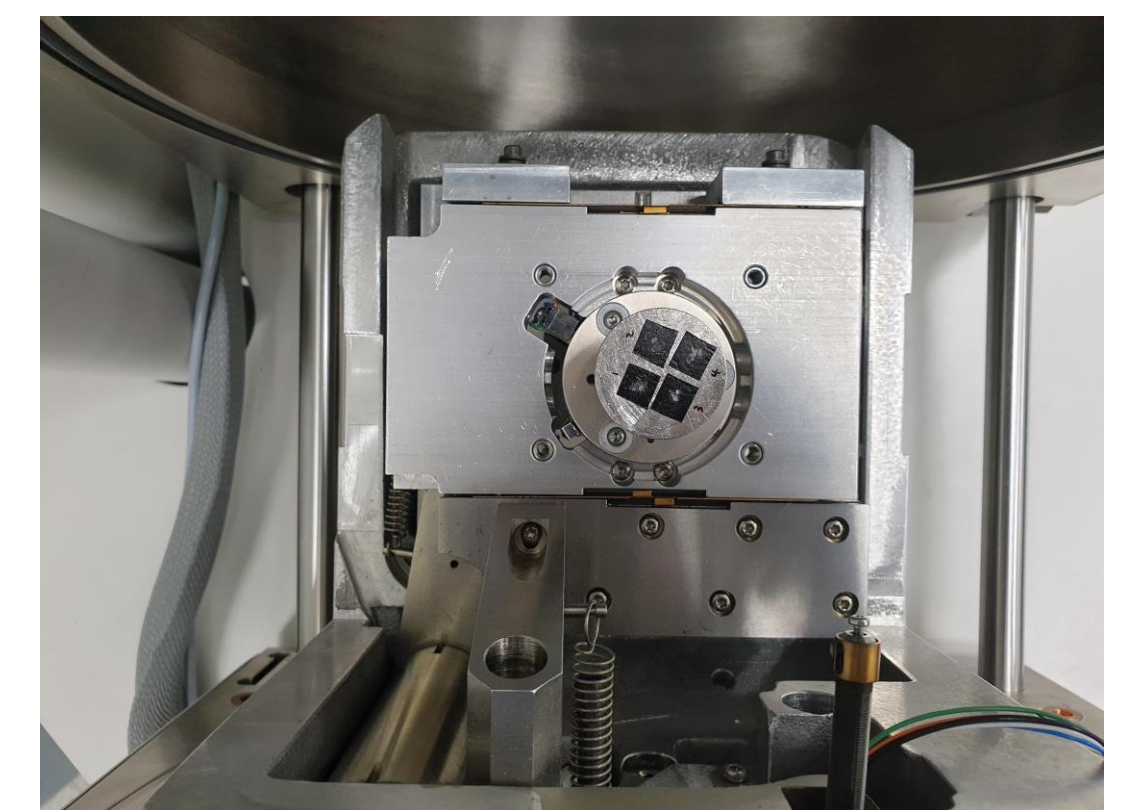
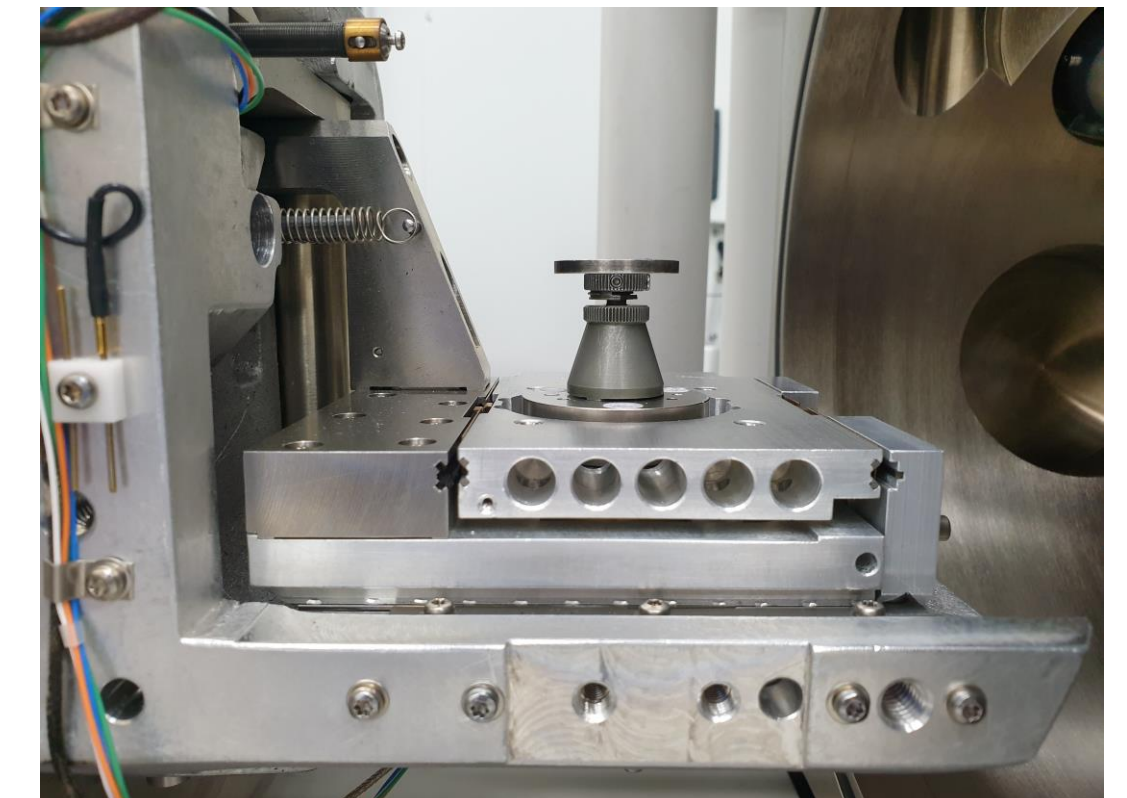
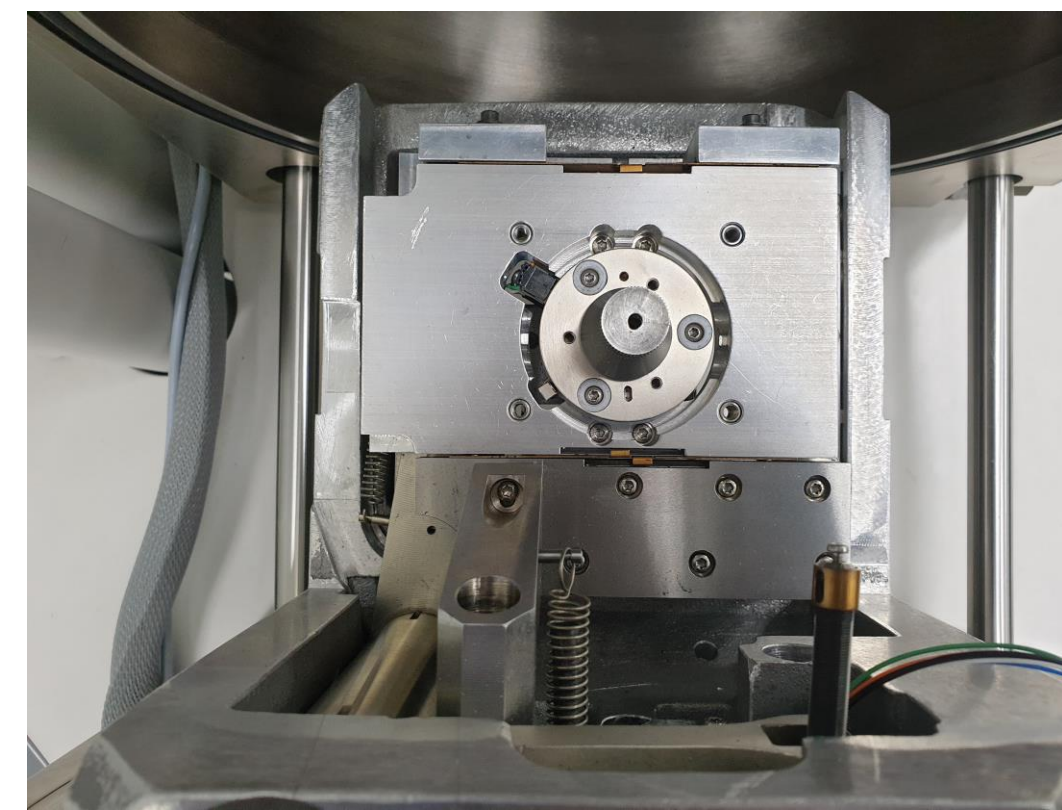
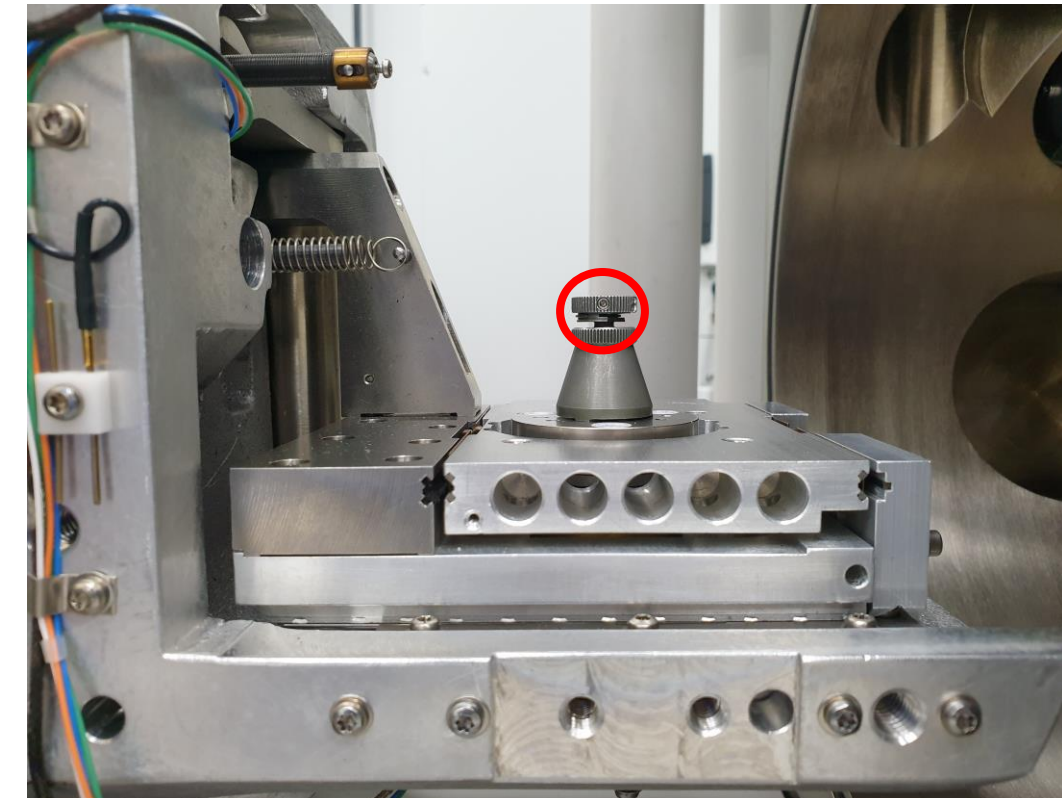
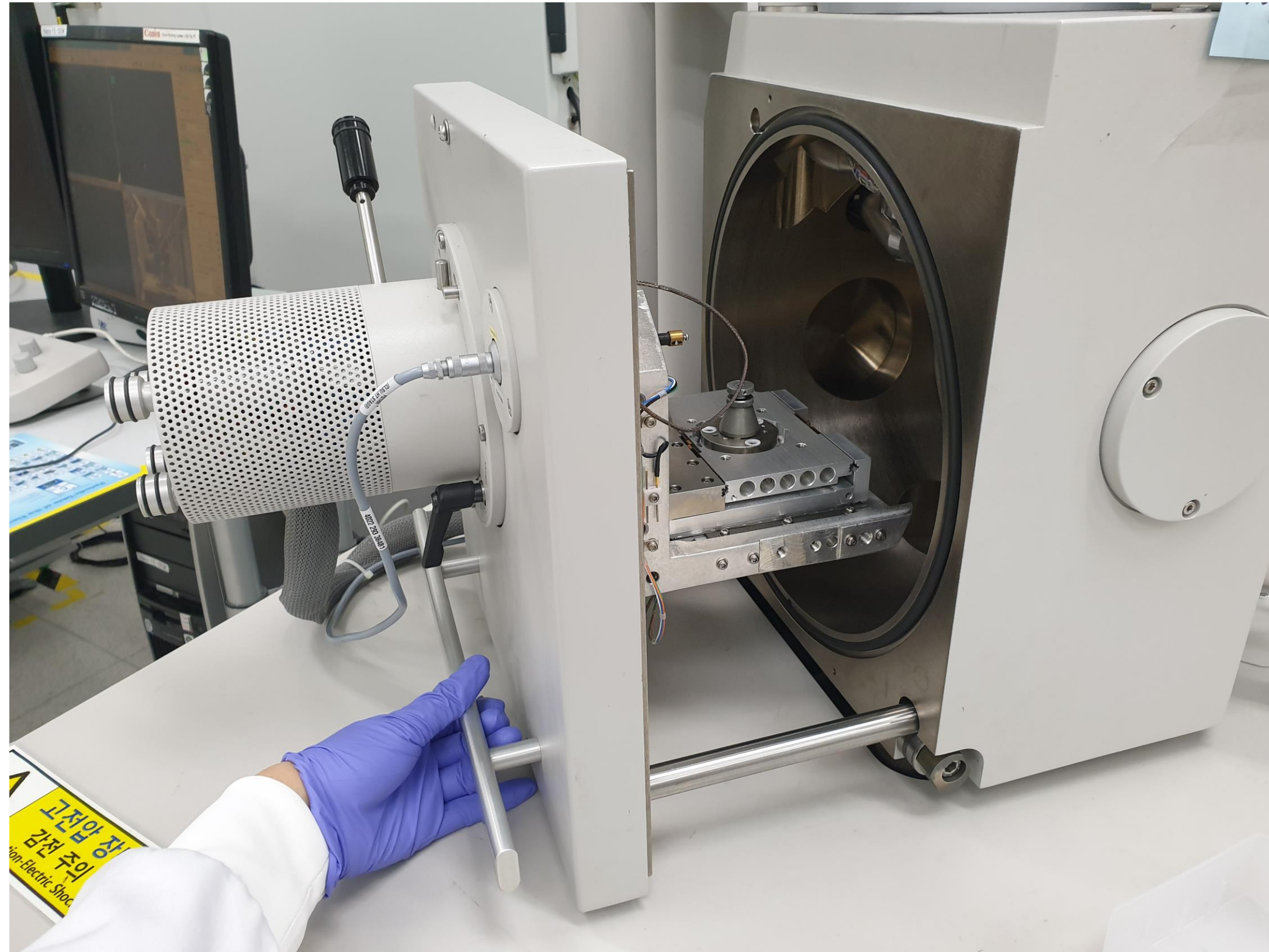
■ FEI Sputter



- **Material: Pt**
- **Sputter current: 20mA**
- **Time: 20s~120s**

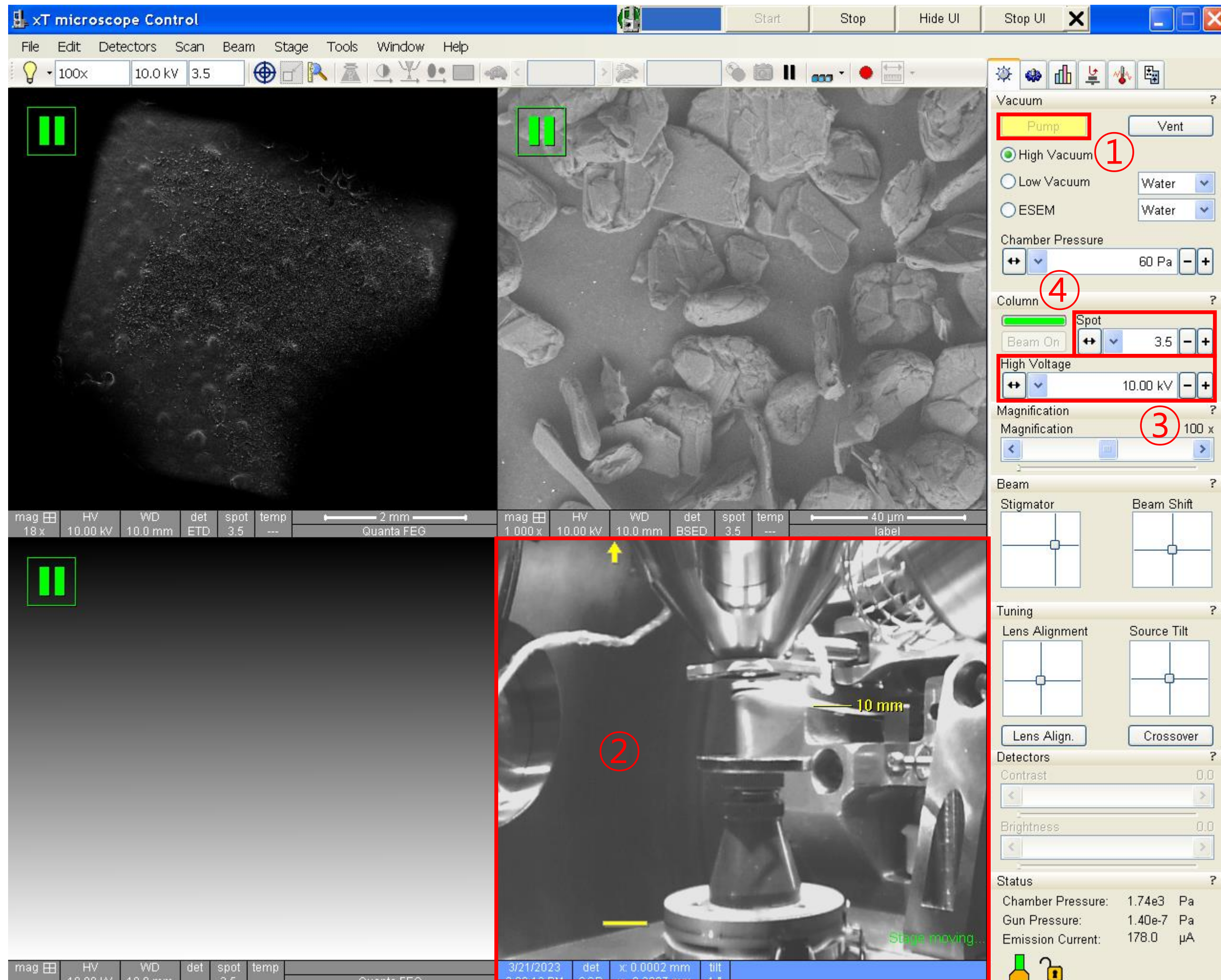
1. Open the lid, and turn on the instrument.
2. Press [ENTER] to change parameters or press [START] to run.
3. Press the lid until the turbo speed reaches 20%.
4. When the coating is finished, the first screen is displayed.
5. Open the lid, remove the specimen and turn off the instrument.

Loading the specimen stub



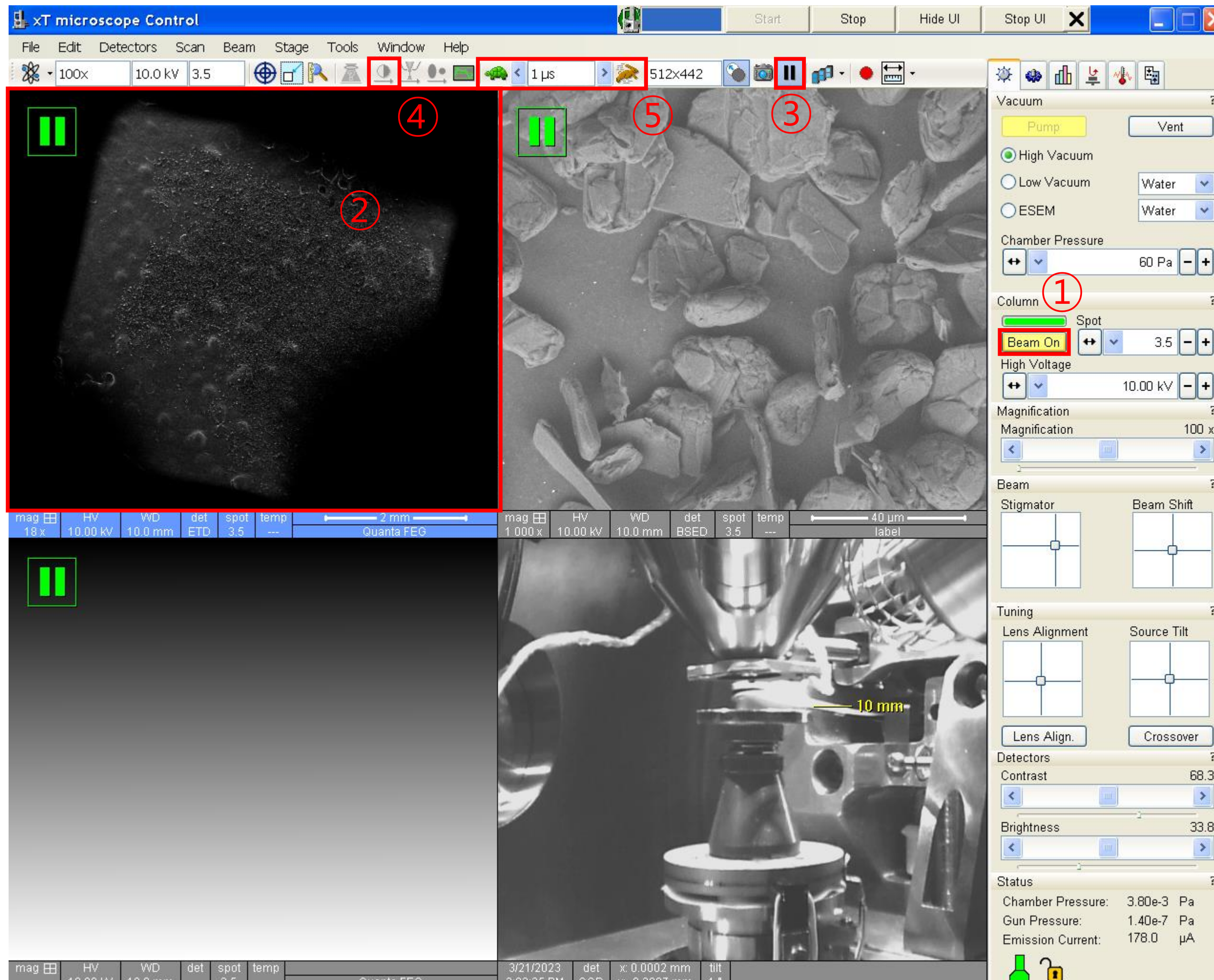
1. Pull the handle to open the chamber door.
2. Insert the stub into the holder and tighten the screw.

Acceleration Voltage & Spot Size



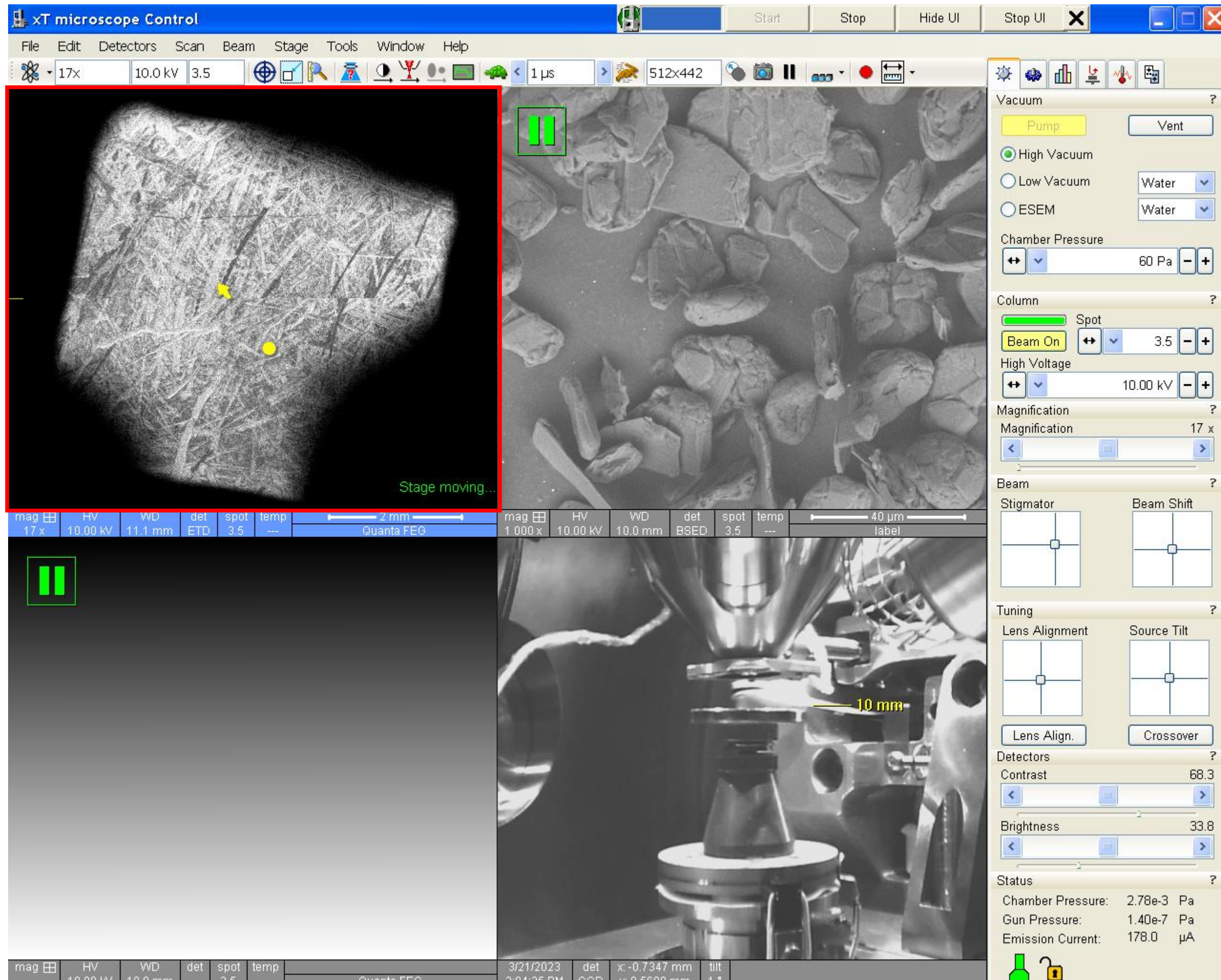
1. Click [Pump].
2. Click on the 4th screen.
3. Hold down the mouse scroll and drag up so that the highest part of the specimen touches the 10mm marker. (Proceed while vacuuming)
4. Choose [High Voltage].
5. Choose [Spot]. (3~4)

Beam on



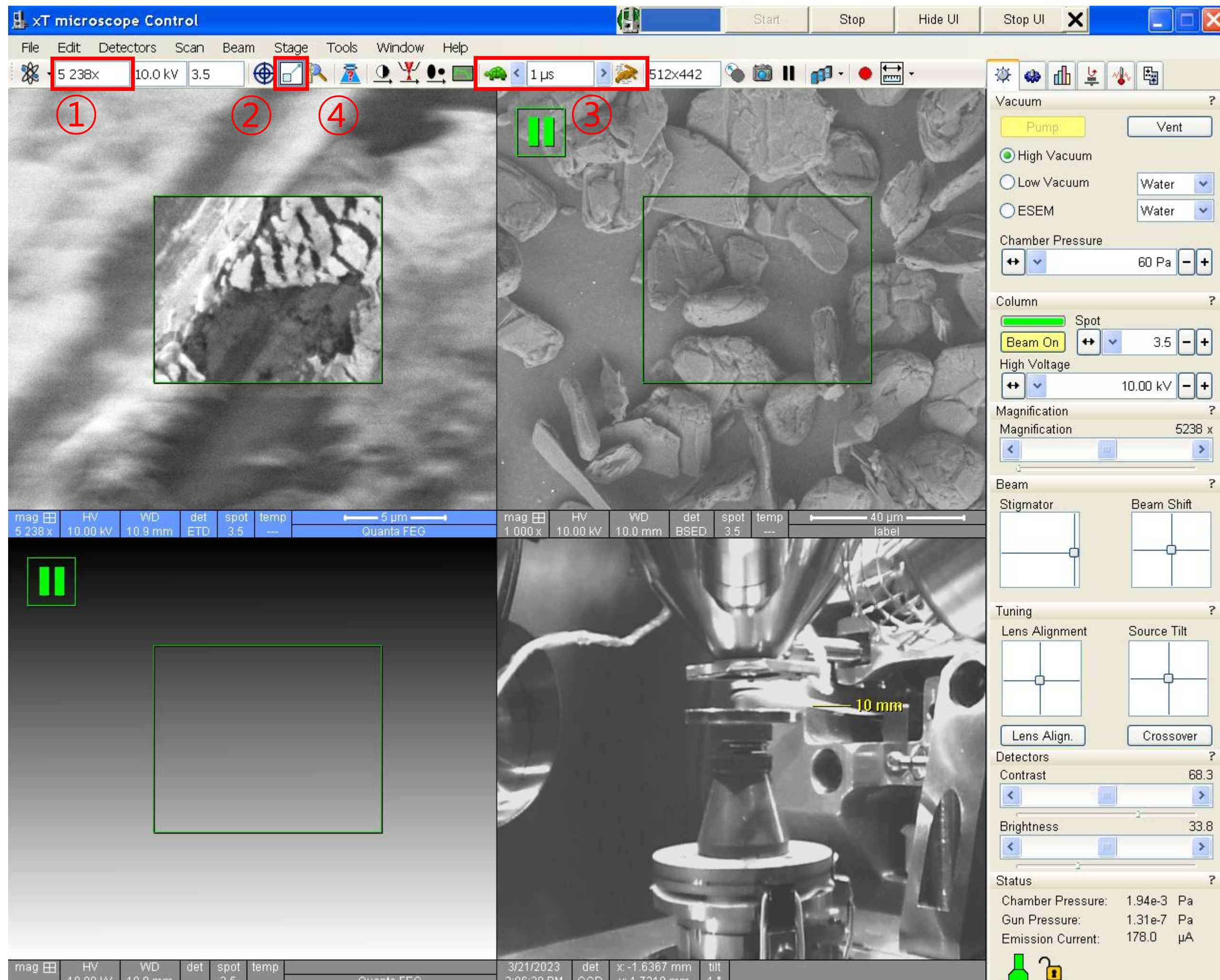
1. Click [Beam On].(Gray → Yellow)
2. Click on the 1st screen.
3. Click [Pause].
4. If the screen is too dark or too bright, click [Auto Contrast Brightness].(You can manually adjust the [Brightness] or [Contrast] knob individually.) → This process can be performed at any time during image observation.
5. Choose the [Dwell Time].(0.8~1 μ s)

Finding the sample



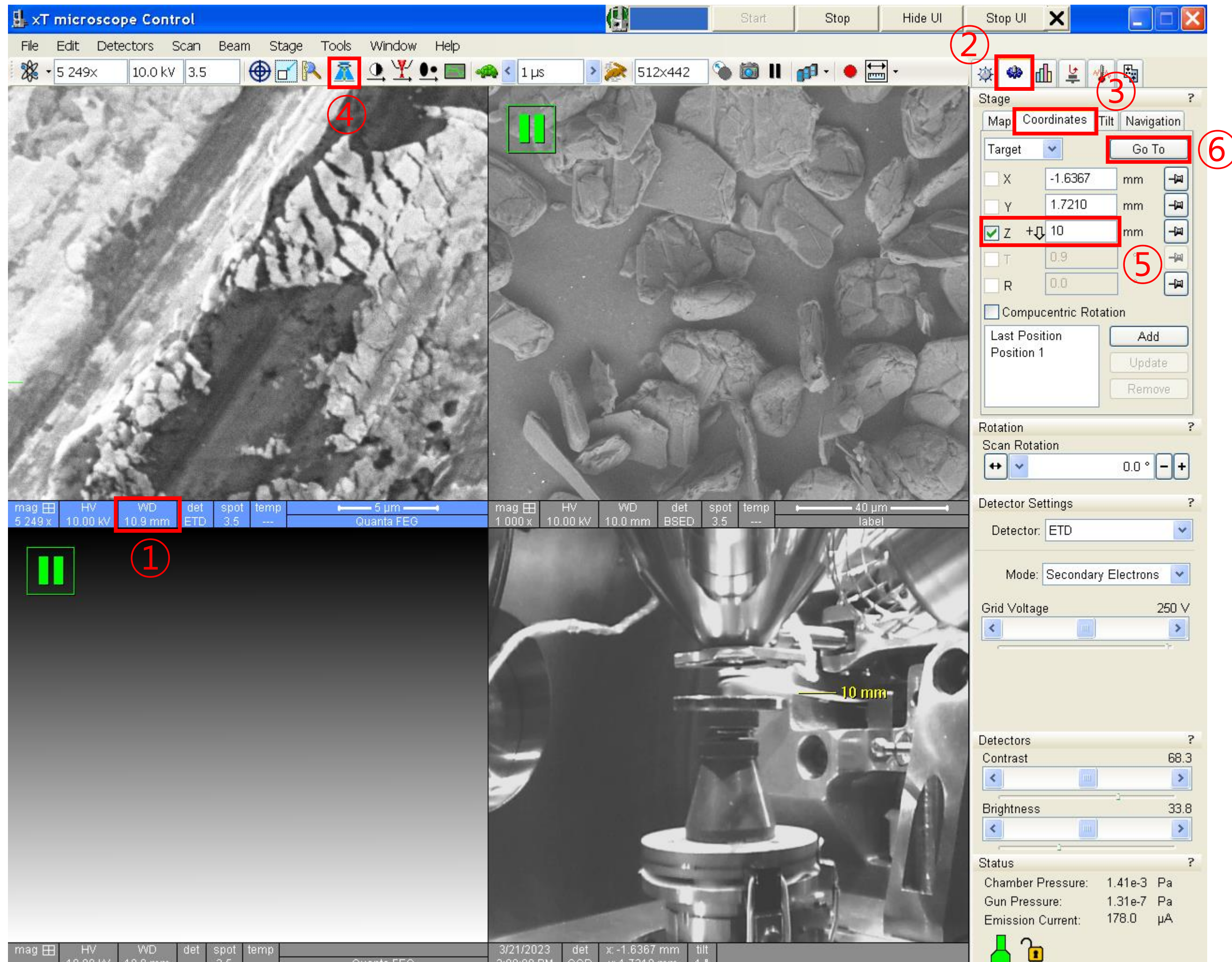
1. Minimize magnification and find specimens.
2. If the image is blurry, use the [focus] knob to adjust the focus.
3. Move the stage to the location you want to observe.
 - How to move the stage position
 - 1) Drag with the mouse scroll pressed
 - 2) If you double-click the desired location, that part moves to the center of the screen.

Focus & Stigmator



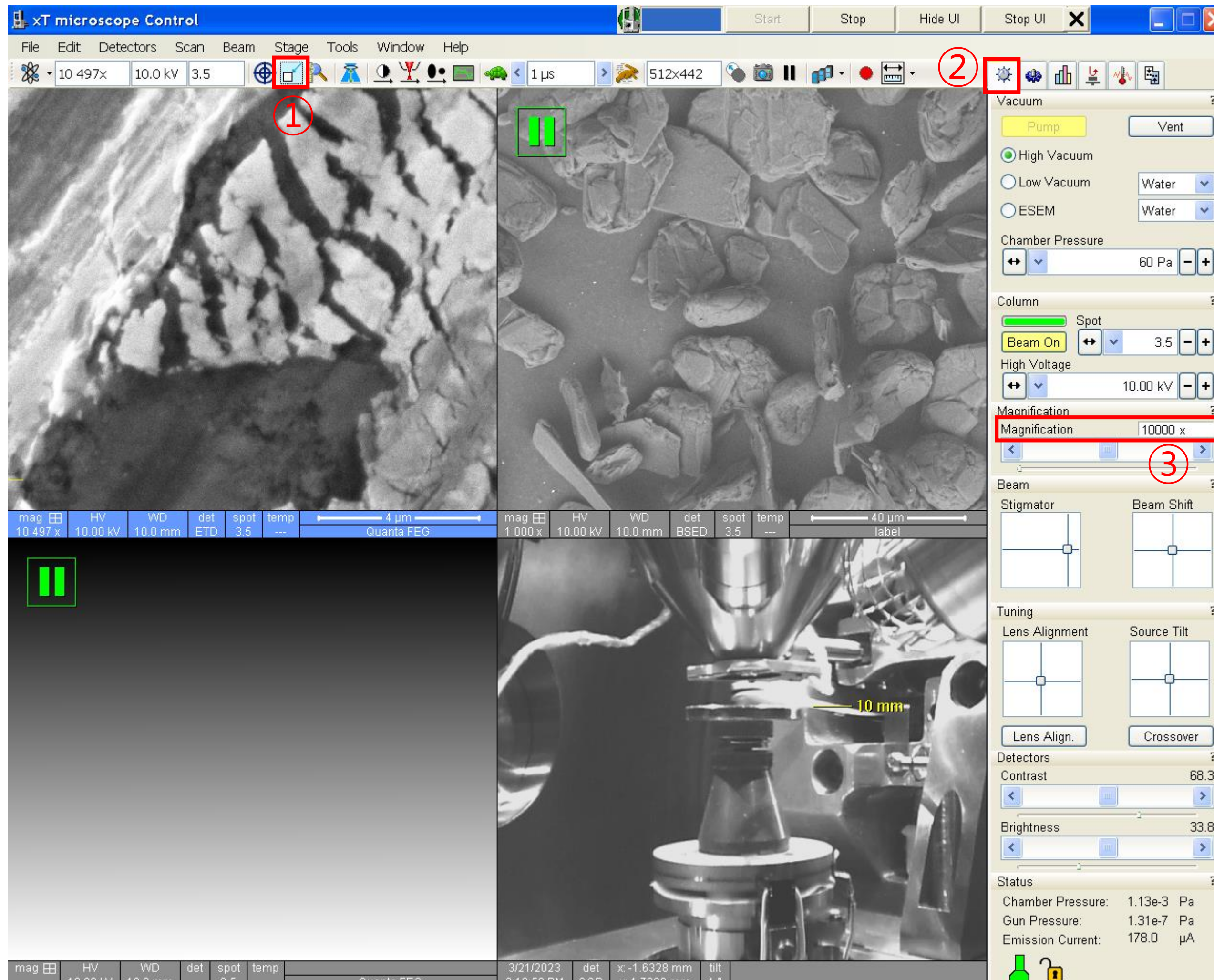
1. Use the magnification knob to slowly raise the magnification to **5000 times** and adjust the focus in between. (Coarse: fast adjustment, Fine: fine adjustment)
2. Click [Reduced Area].
3. Check the [Dwell Time].
4. Adjust the focus.
5. Adjust stigmator X, Y knobs one by one.
6. Adjust the focus.
7. Click [Reduced Area].

Link Z to FWD



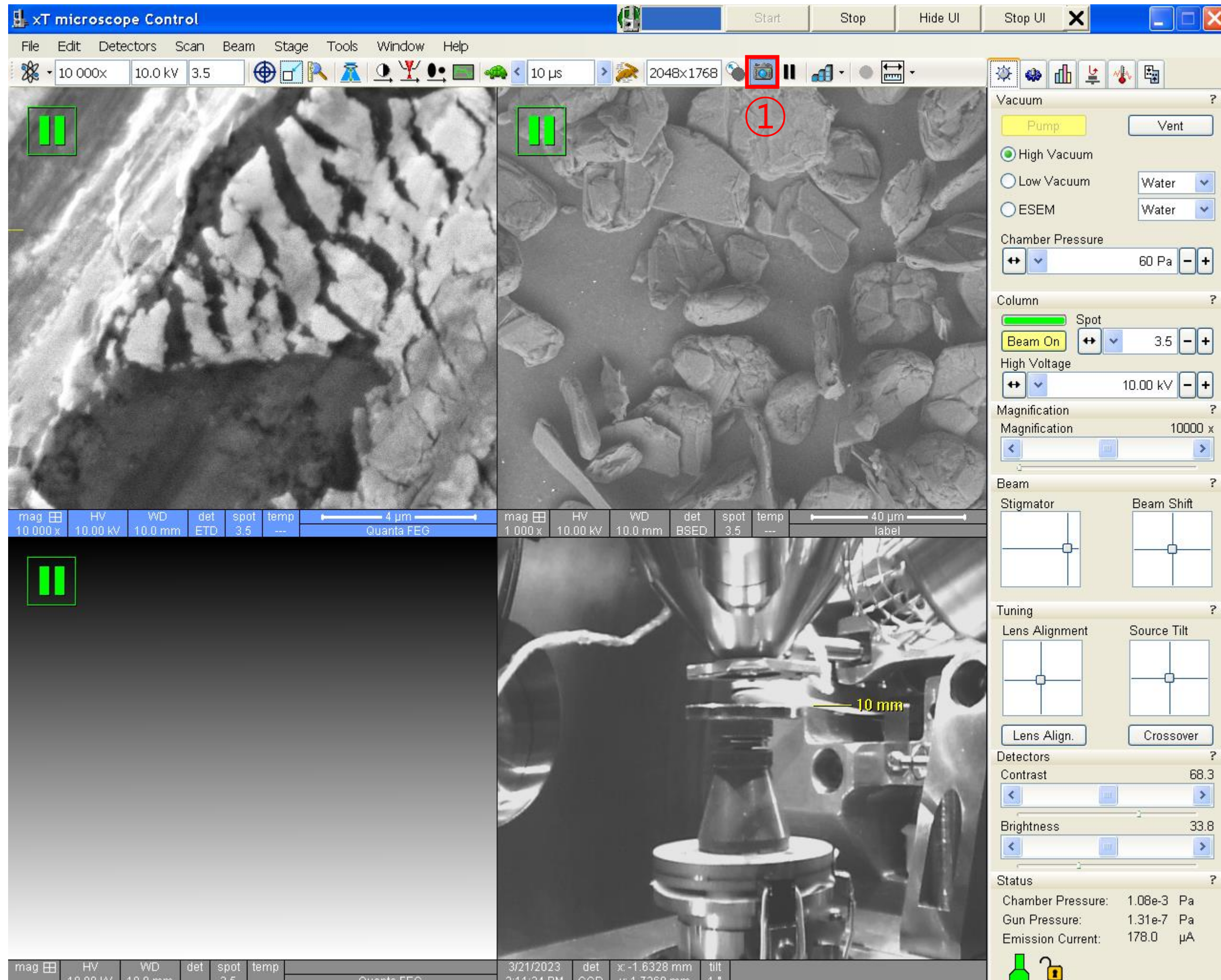
1. Check the WD.(10mm±1mm)★
2. Click [Navigation] - [Coordinates].
3. Click [Link sample Z to Working Distance].
4. Put 10 to [Z].
5. Click [Go To].

Taking photo



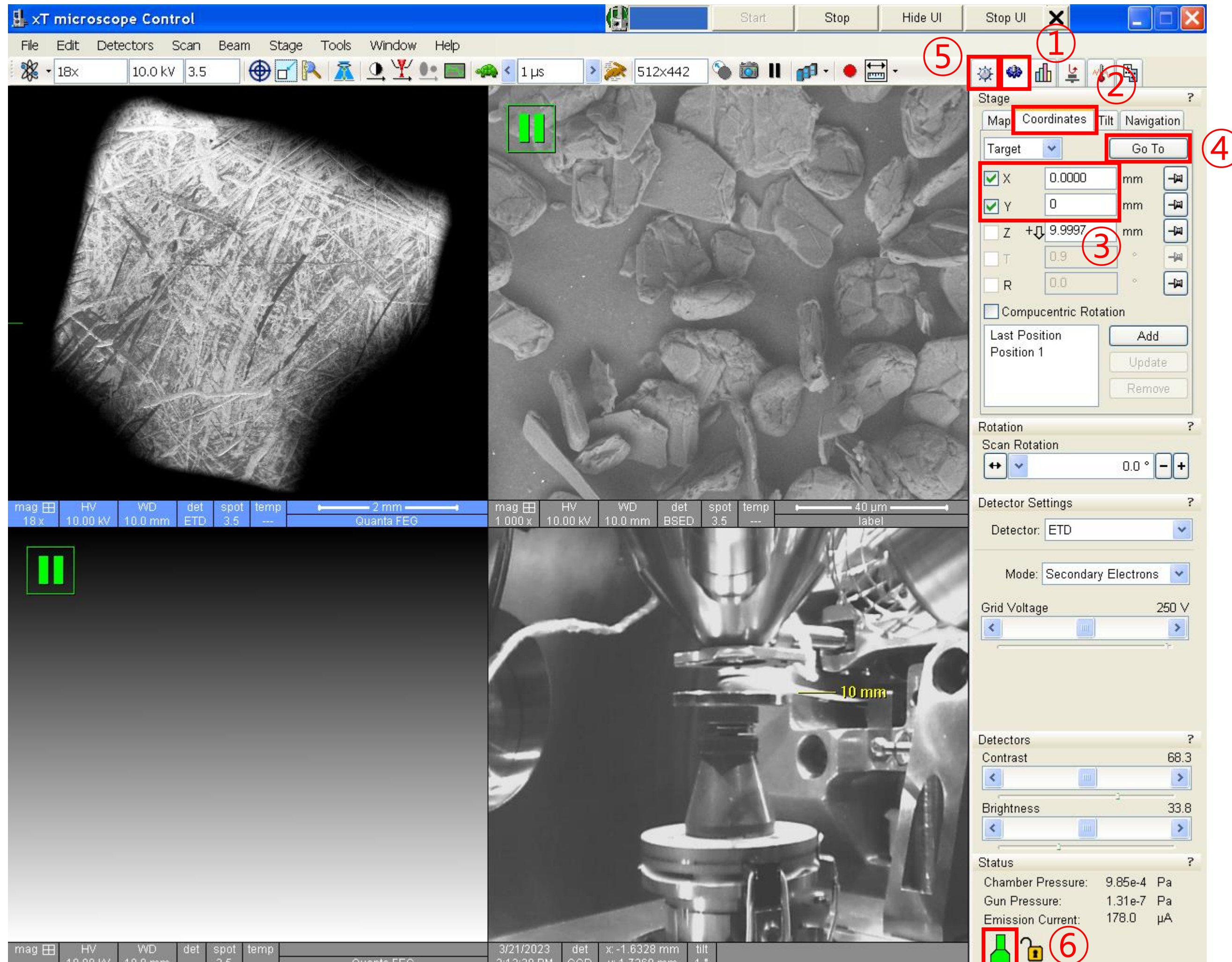
1. Move the stage to the location you want to observe.
2. Adjust the magnification slightly higher than the magnification you want to observe.
3. Click [Reduced Area].
4. Adjust the focus.
5. Adjust Stigmator X, Y knobs one by one.
6. Adjust the focus.
7. Click [Reduced Area]
8. Click [Beam Control]
9. Double-click the value of [Magnification] and enter the desired magnification.

Taking photo



1. Click [Photo]
2. Select the data storage location.(Desktop-SEM data-Analysis year-Professor folder-Personal folder-Date folder)
3. Repeat steps 1 in the previous slide to 2 in this slide.

Finish



1. Minimum magnification.
2. Click [Beam On]. (Yellow → gray) ★
3. Click [Navigator] - [Coordinates].
4. Put 0 in [X], [Y]. ★
5. Click [Beam Control] - [Vent].
6. When the Chamber icon changes from green to gray, open the chamber and remove the specimen.
7. Click [Pump].

Transfer SEM data

1) Open
Chrome
Internet Explorer
Firefox (Window XP)

2) Type
10.24.9.32 (Online, Windows 10)
100.100.100.30
(Offline, Windows 10 <)

3) Login UCRFSERVER

UCRFSERVER

로그인

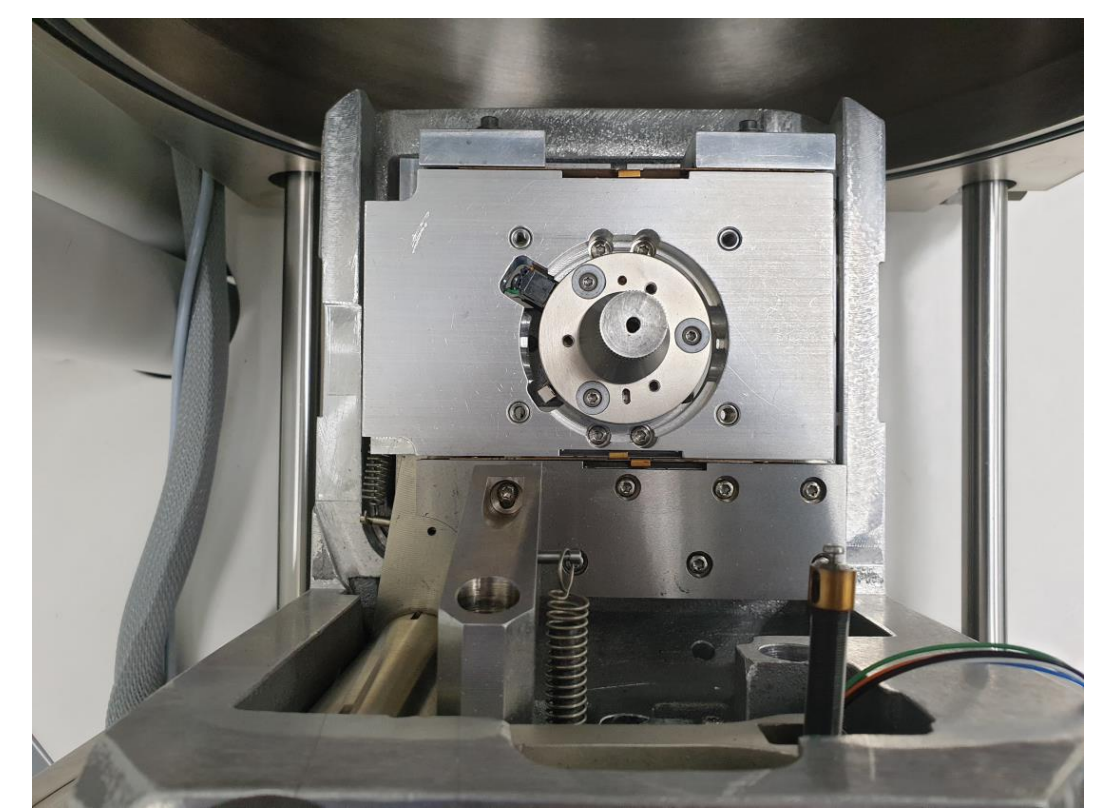
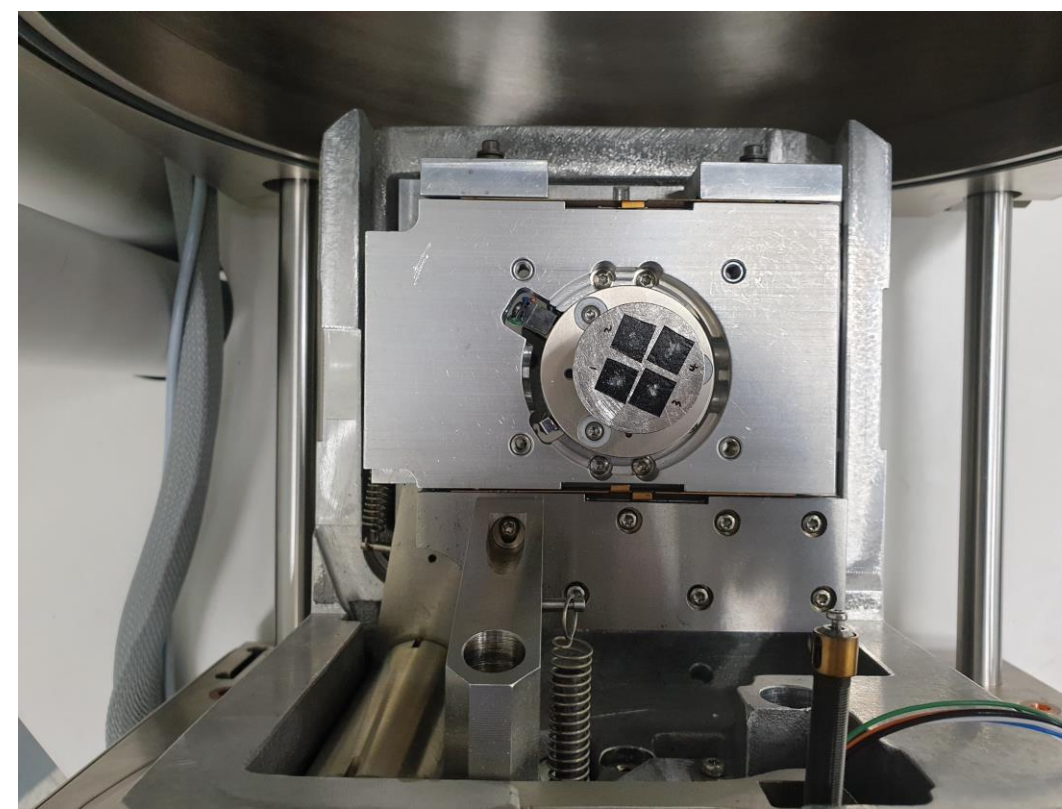
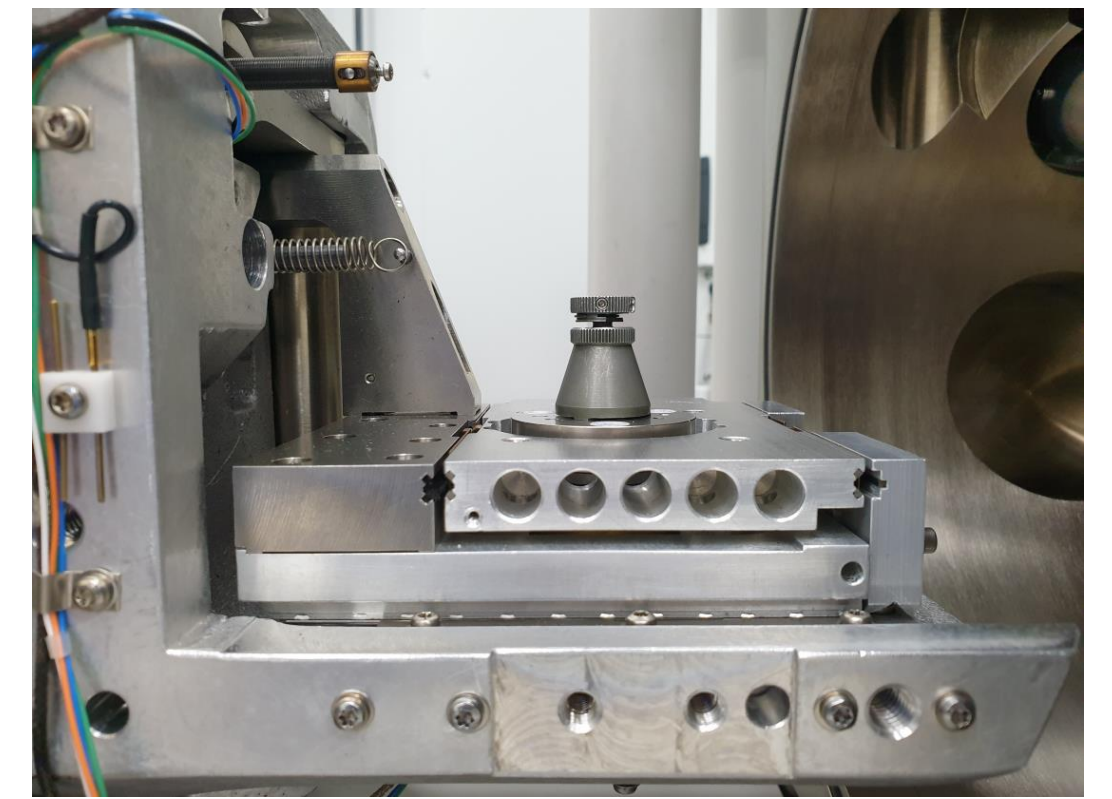
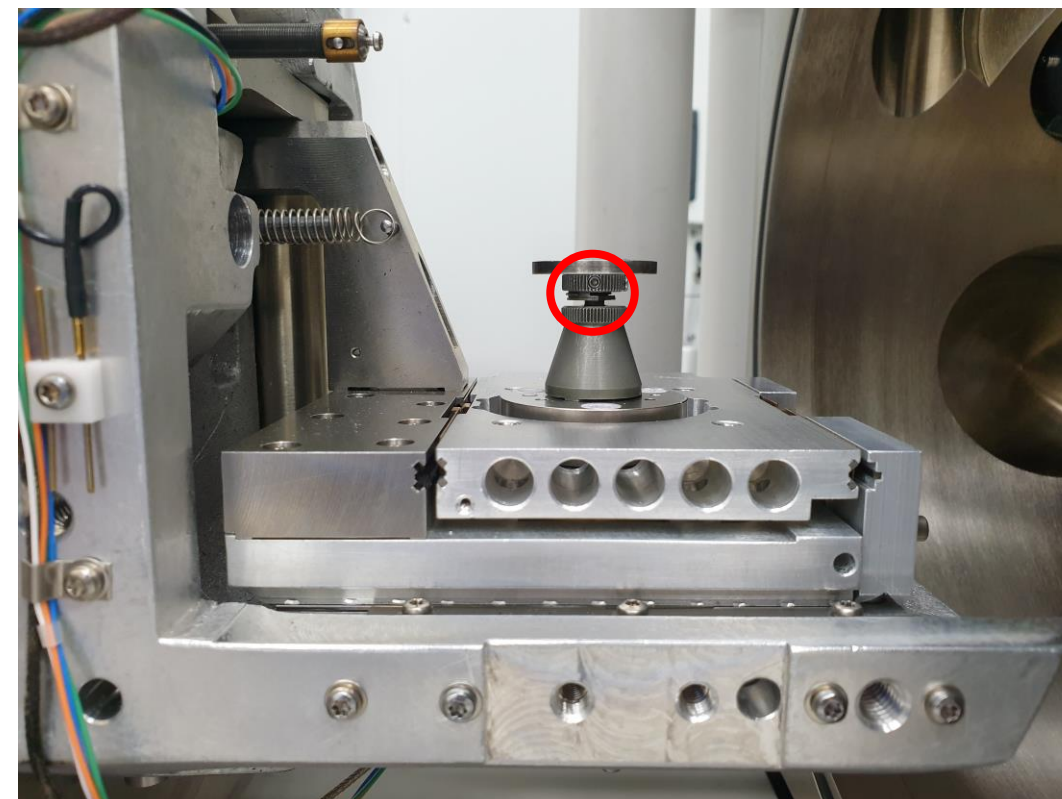
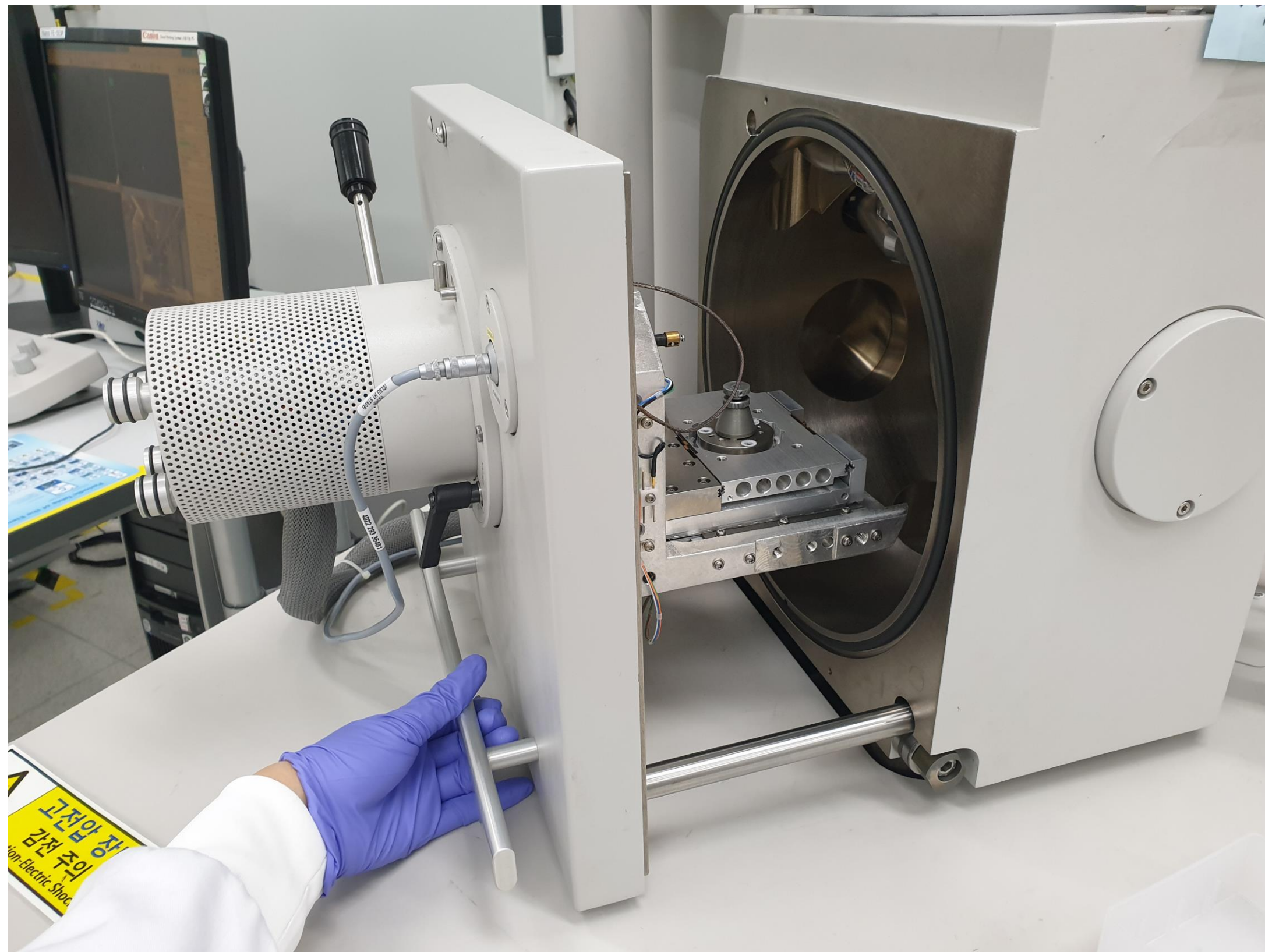
Online

Offline

1. Do not use USB when transferring SEM data
2. Double-click the web browser.(Chrome, etc..)
3. Enter 100.100.100.30. in the address bar.
(Enter 10.24.9.32 when downloading from Lab)
4. Enter your Lab ID and password.
5. Find your professor's folder and create your own folder.
6. Drag the SEM data into your own folder.
7. Close the window when the move is complete.

- UCRF server manager: Park Ji-hye(4035)

Unloading the specimen stub



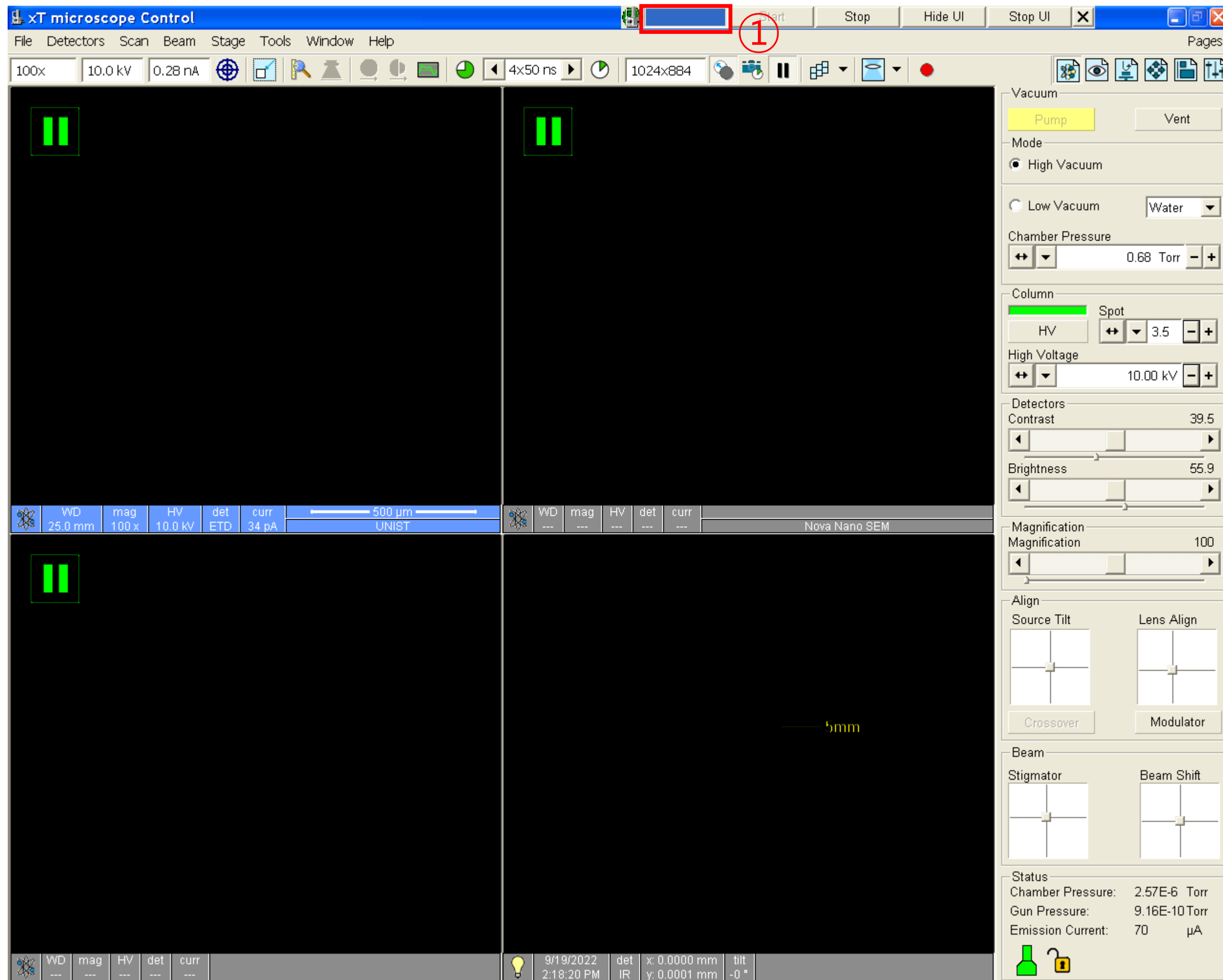
Checklist after Experiment

- 1. Remove the sample from the stub.
- 2. Wipe the stub with ethanol.
- 3. Put the specimen holder back in place.★
- 4. When using weekends or holidays, check the [Daily checklist in lab] and sign the checker's signature.
- 5. Enter the name of your advisor and submit it in the original place with your signature or stamp.★

Daily checklist in lab.

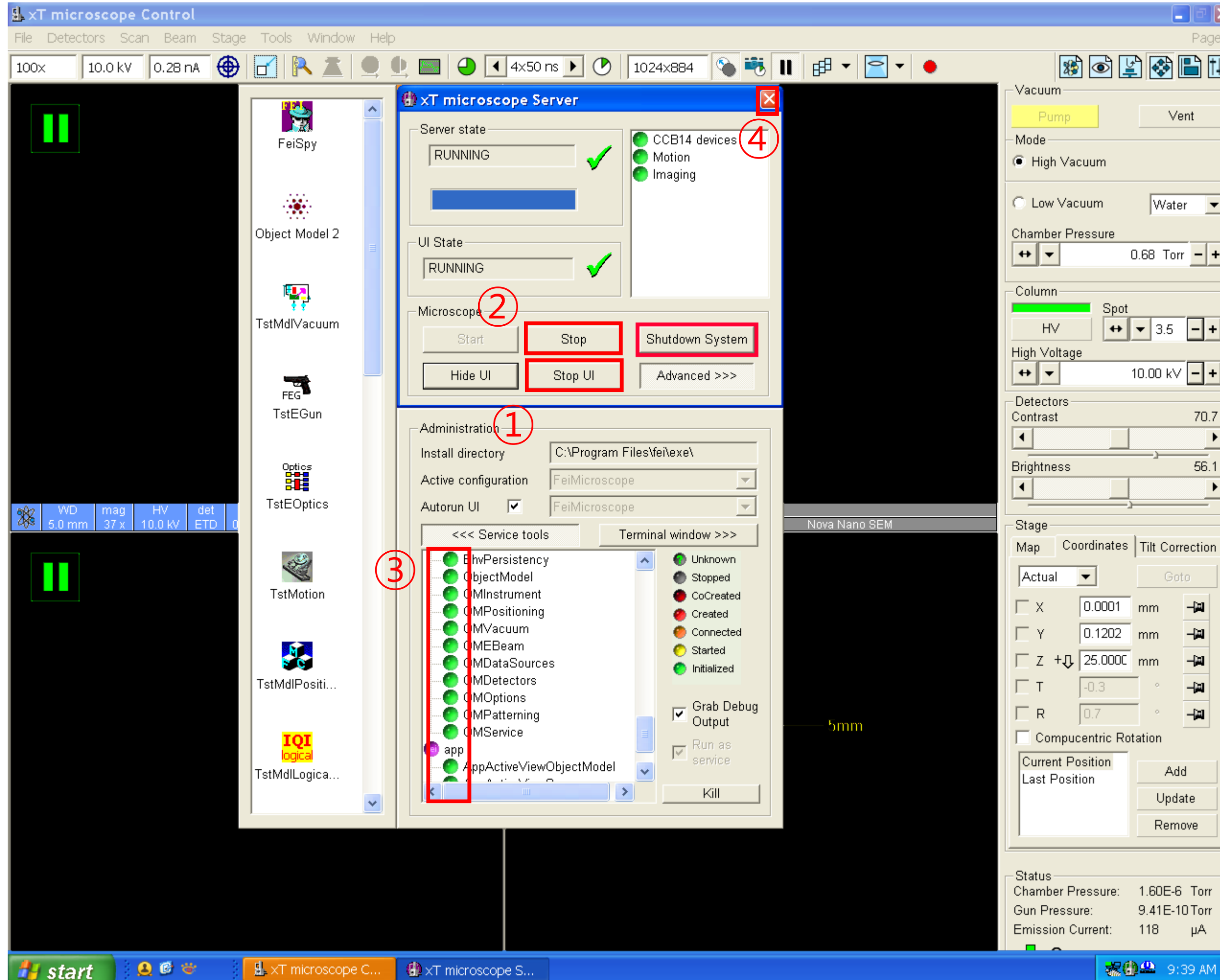
Lab title	Electron Microscopy Preparation	Bldg./NO.	102-B115	Date	
Division	checkpoint			check	
General Safety	Laboratory overall cleanliness condition.				
	Smoking or bringing food into the lab.				
	Management status of experimental equipment such as safety regulations, safety signs, personal protective equipment, first aid, etc.				
	Checking the presence of a pre-hazard risk analysis report.				
Electric	Checking the power supply status of unused electrical equipment and checking for overloaded outlets.				
	Using grounded outlets, checking damage on the insulating coating of electric wiring, electric wiring arrangement.				
	Checking ground conditions for preventing external or static disturbances of the instrument.				
	Non-load status around electric panelboards.				
Fire	Fire extinguisher sign, proper fire extinguisher and regular inspection status.				
	Emergency exits, escape routes, and any obstacle blocking the passage.				
	Storage of foreign substances around fire hydrant and fire extinguishers.				
Gas	Outdoor storage of gas containers, no risk of tipping over, and checking ventilation conditions.				
	Corrosion, deformation, nozzle lock status on the exterior of the gas containers and checking the packing time limit of gas containers.				
	Checking installation and operational status of gas leakage detection alarm, anti-backflow/anti-backfire prevention devices, neutralizing decontamination devices.				
	Attachment of pipe marks, gas facility boundaries/warning marks and operation status of regulators and valves.				
	Safe separation distance from surrounding fire hazards.				
Chemical	Keeping hazardous factors handling and management registers and MSDS.				
	Categorizing chemicals by description and storing chemical reagents in safety cabinets.				
Equipment check	SU8220 Cold FE-SEM user: Check the pressure of nitrogen gas				
Confirm		Inspector Signature		(sign)	
		Lab Director Signature		(sign)	

How to reboot the device when SEM PC lag



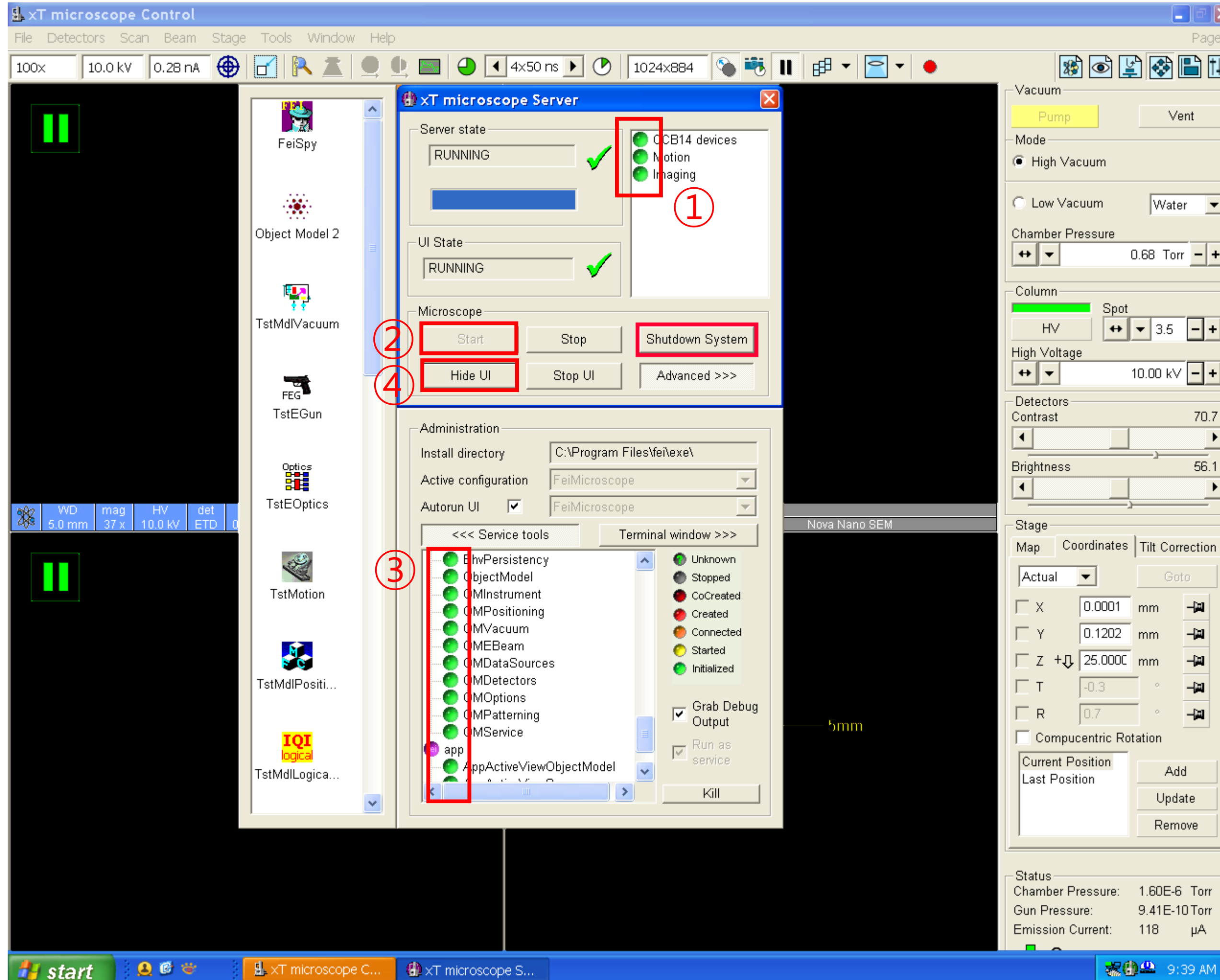
1. Beam off
(If click is not possible, this step is pass.)
2. Click the blue part on the small bar
(If there is no blue small bar, click [xT microscope Server] on your desktop.)

How to reboot the device when SEM PC lag



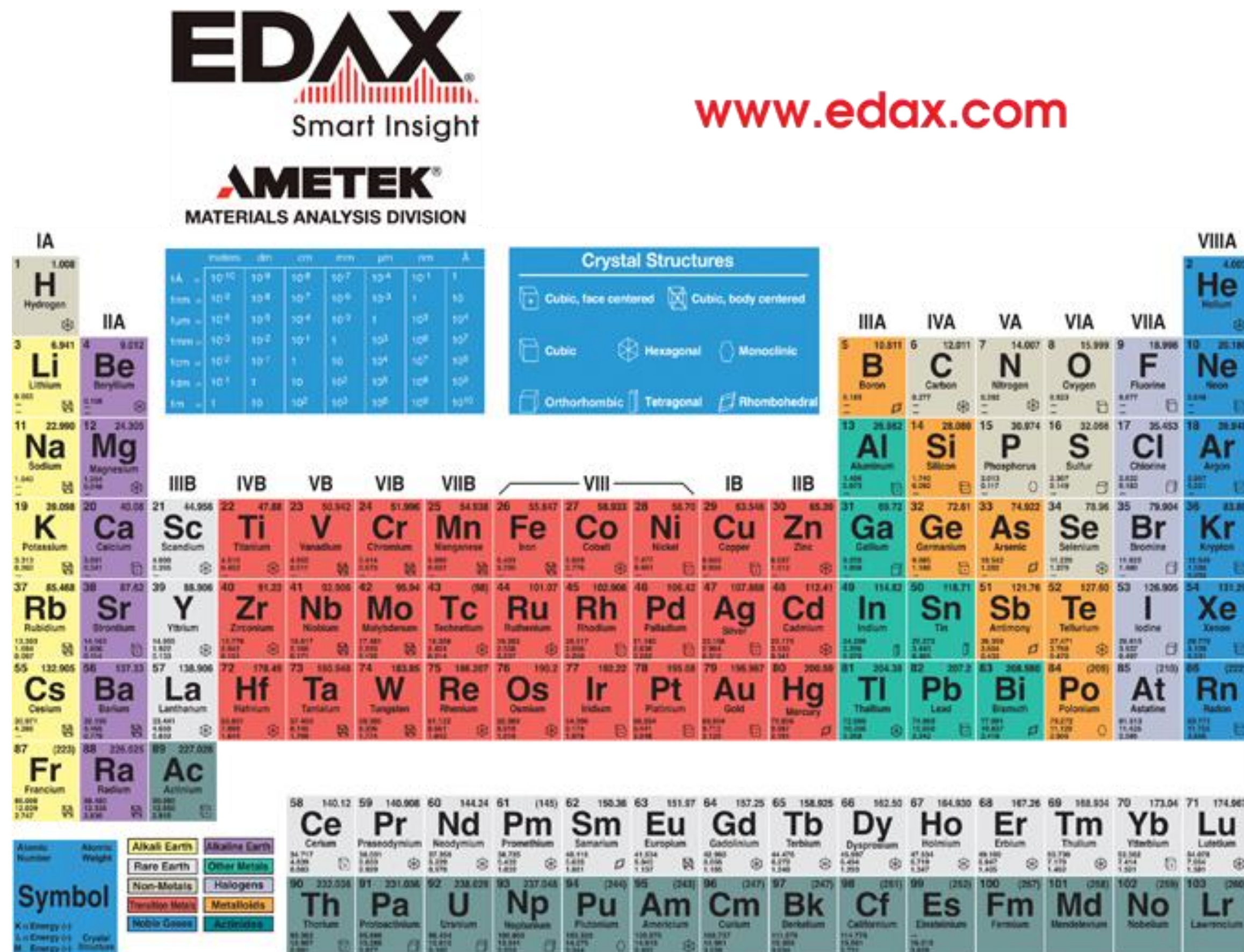
1. Click [Stop UI]
2. Click [Stop]
3. Check the small circles below change from green to dark grey
4. Close the window
5. Restart SEM PC
6. SEM PC ID: support PW: feico95-001
7. Click [xT microscope Server]

How to reboot the device when SEM PC lag



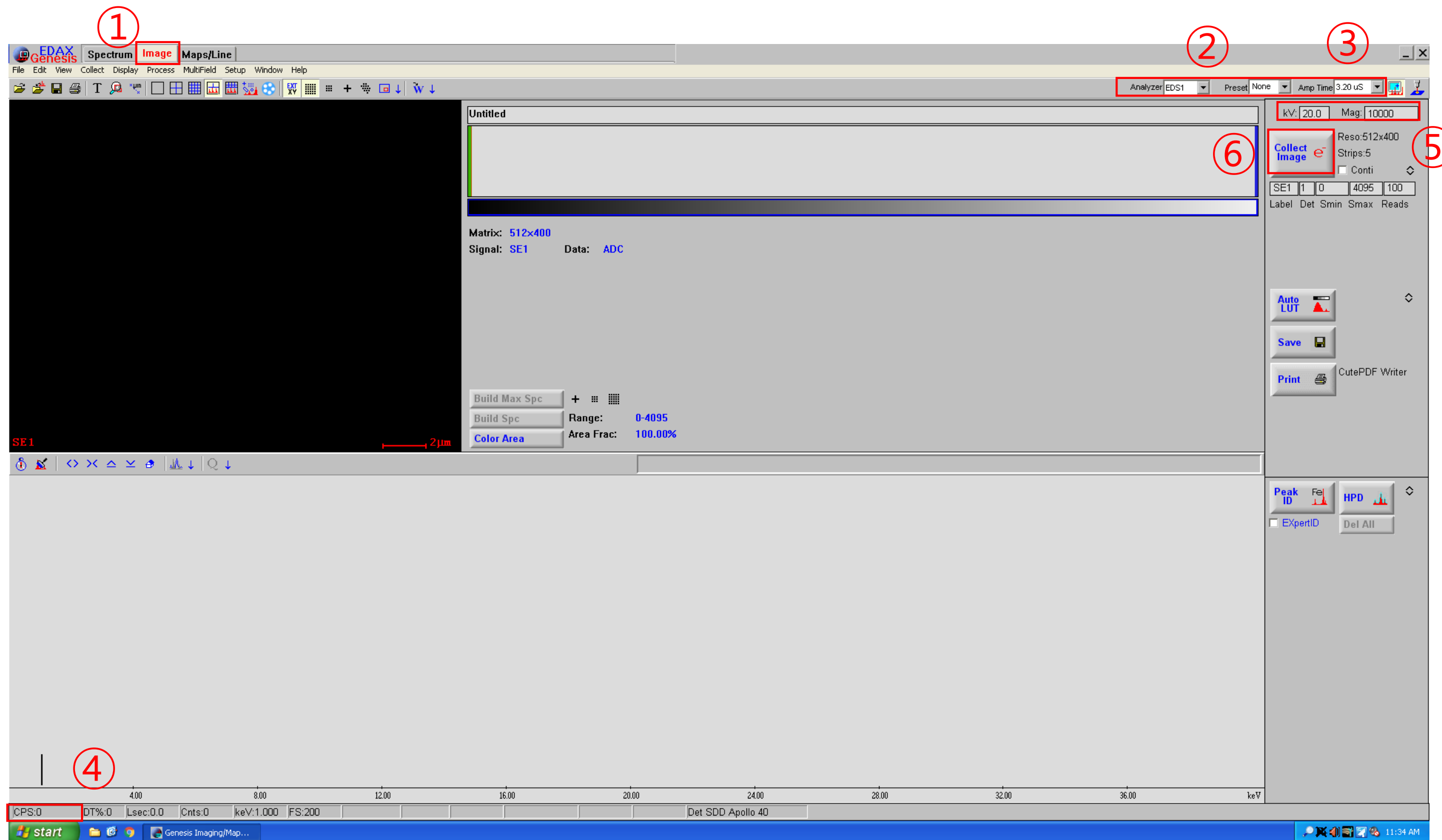
1. Make sure three circles in the upper right corner are green
2. Click [Start]
3. Check the small circles below change from dark grey to green
4. Click [Start UI]
5. UI SEM PC ID: support PW: feico95-001
6. Click [Yes]

Energy Dispersive X-ray Spectroscopy



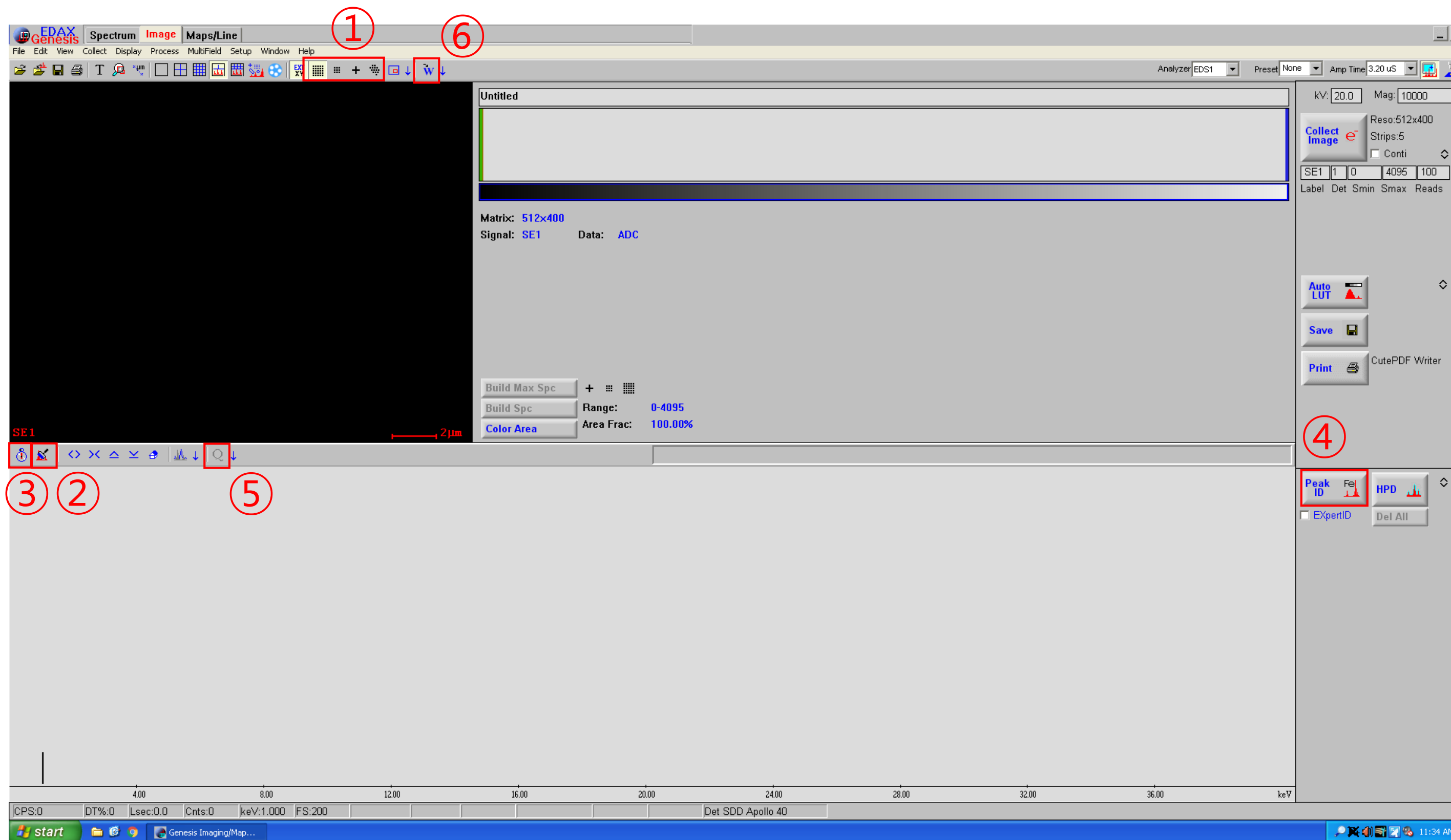
1. Press the switch on the back of the Edax controller.(Check the 2 green lights on the front)
2. Select an appropriate accelerating voltage.★
(1.5 times kV of the x-ray value of the element to be observed or unknown specimens 20 kV)
3. Select a [Spot size].(4~5).
4. Move to the position of the specimen to be measured and adjust the magnification.
5. On the fourth screen, press [Pause] to stop the screen.★
6. Click [Scan]-[External] on the first screen.
7. Double-click [Genesis] in Edax PC.

EDS Spectrum Analysis



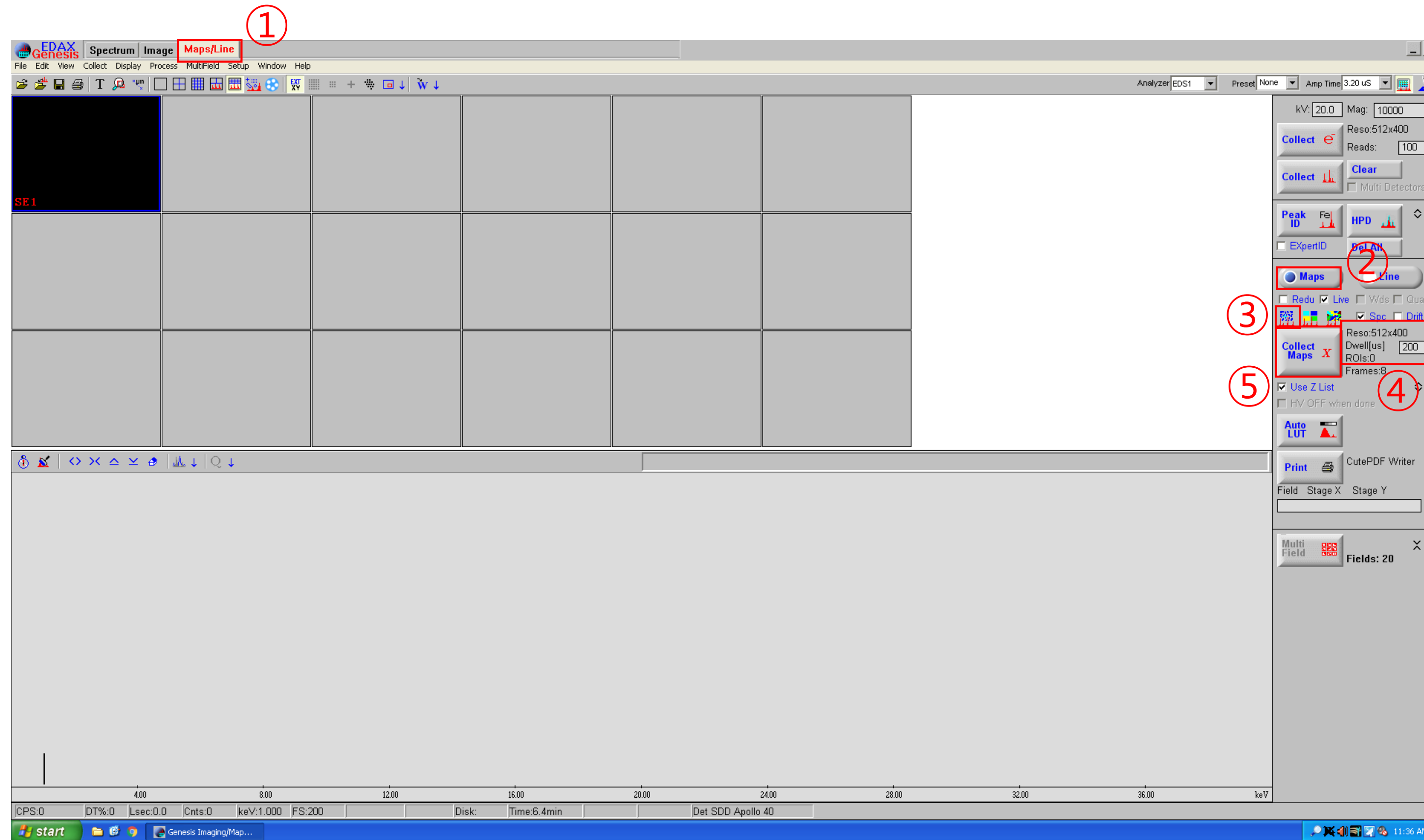
1. Click [Image]
2. [Analyzer] select EDS2.
3. Select the time you want to measure in [Preset]. (None continues to be analyzed until [Collect] is pressed again.)
4. Adjust [Amp Time] to 3-6.
5. Check if the CPS value is properly displayed.
6. Input the current acceleration voltage and magnification.
7. Click [Collect e]

EDS Spectrum Analysis

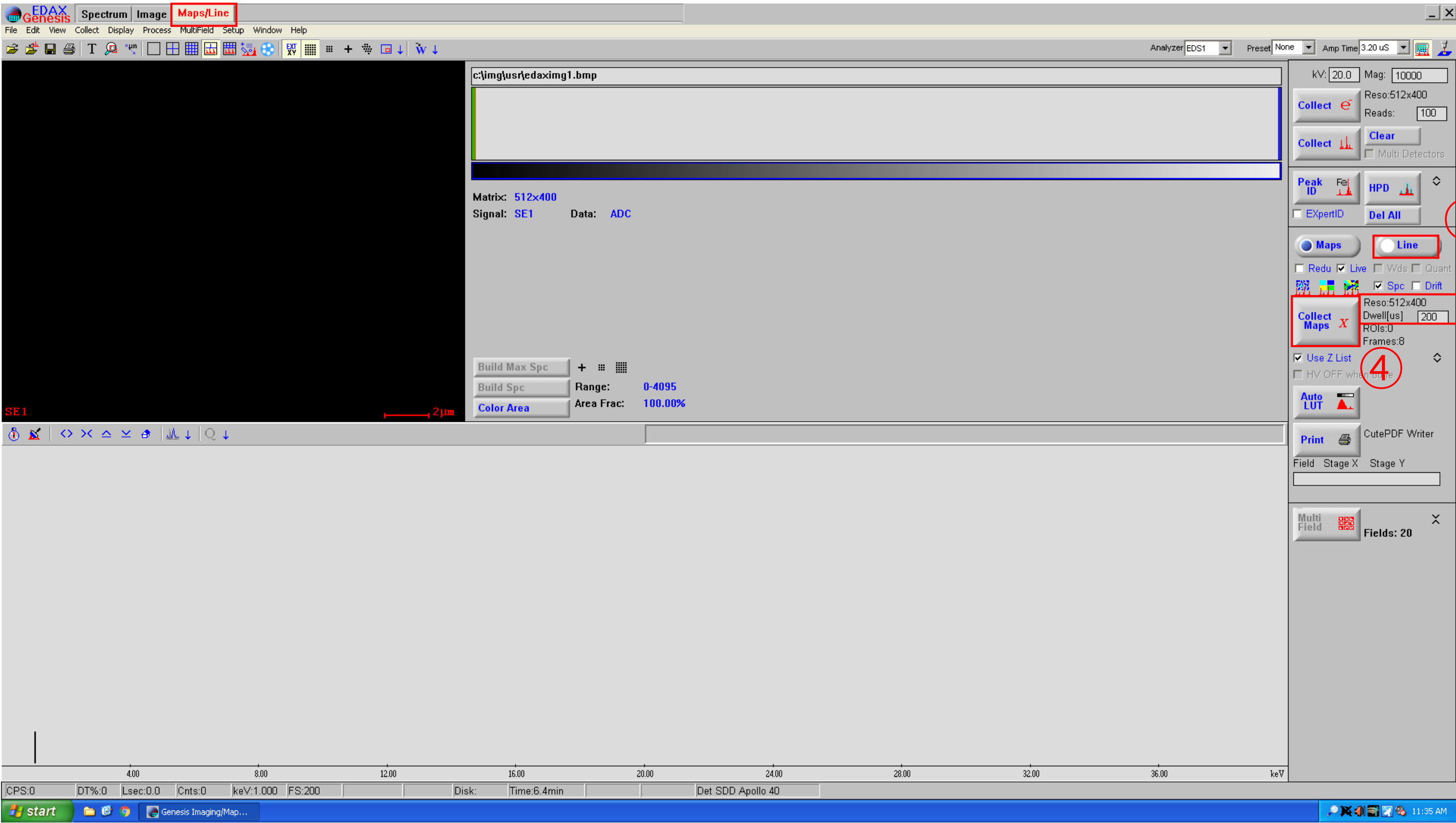


1. Select the area you want to measure.
2. Clear the existing spectrum.
3. Click [Collect]
4. Click [Peak ID]
5. Click [Q] - [W] - [W].

EDS Mapping Analysis

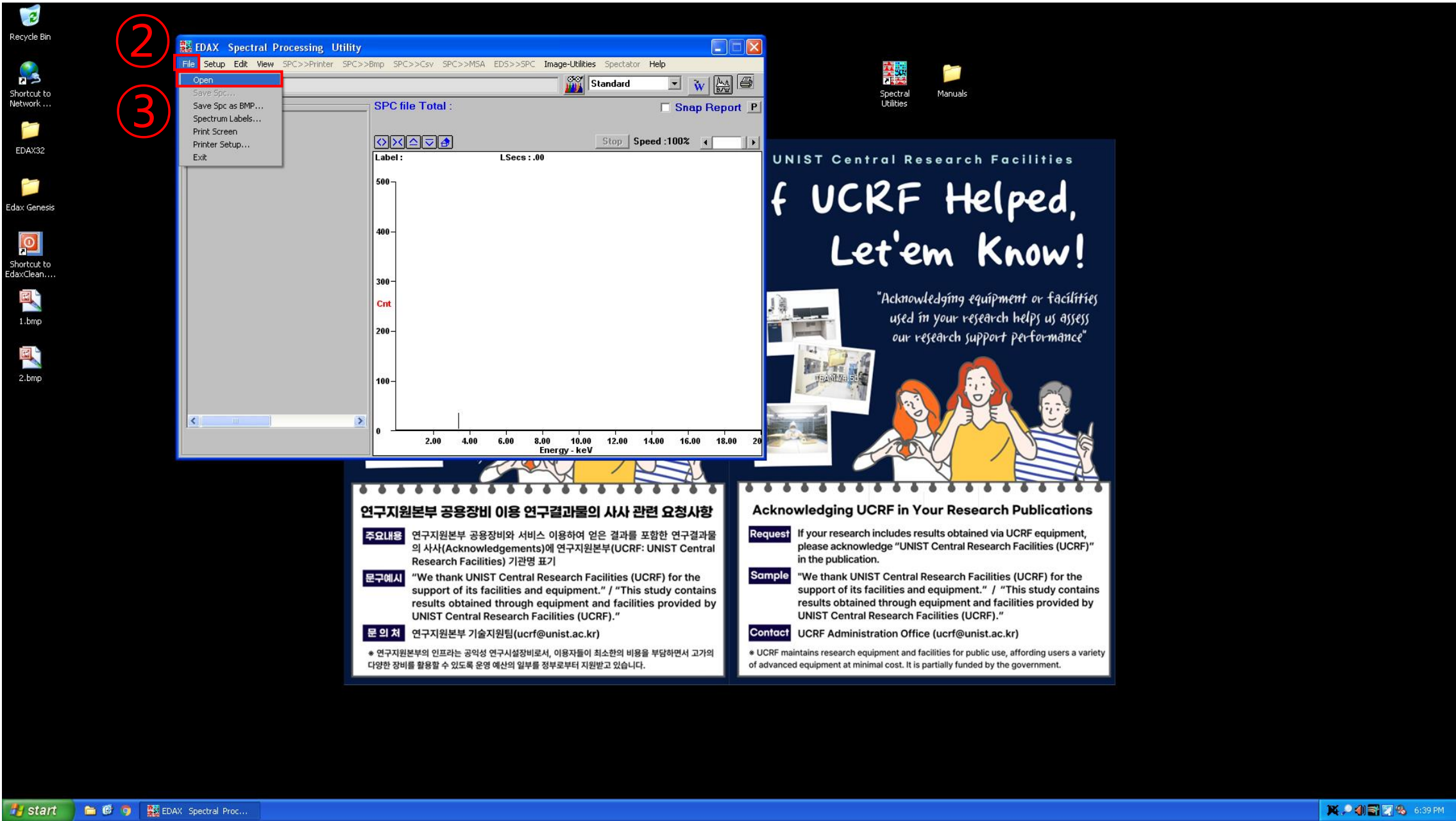
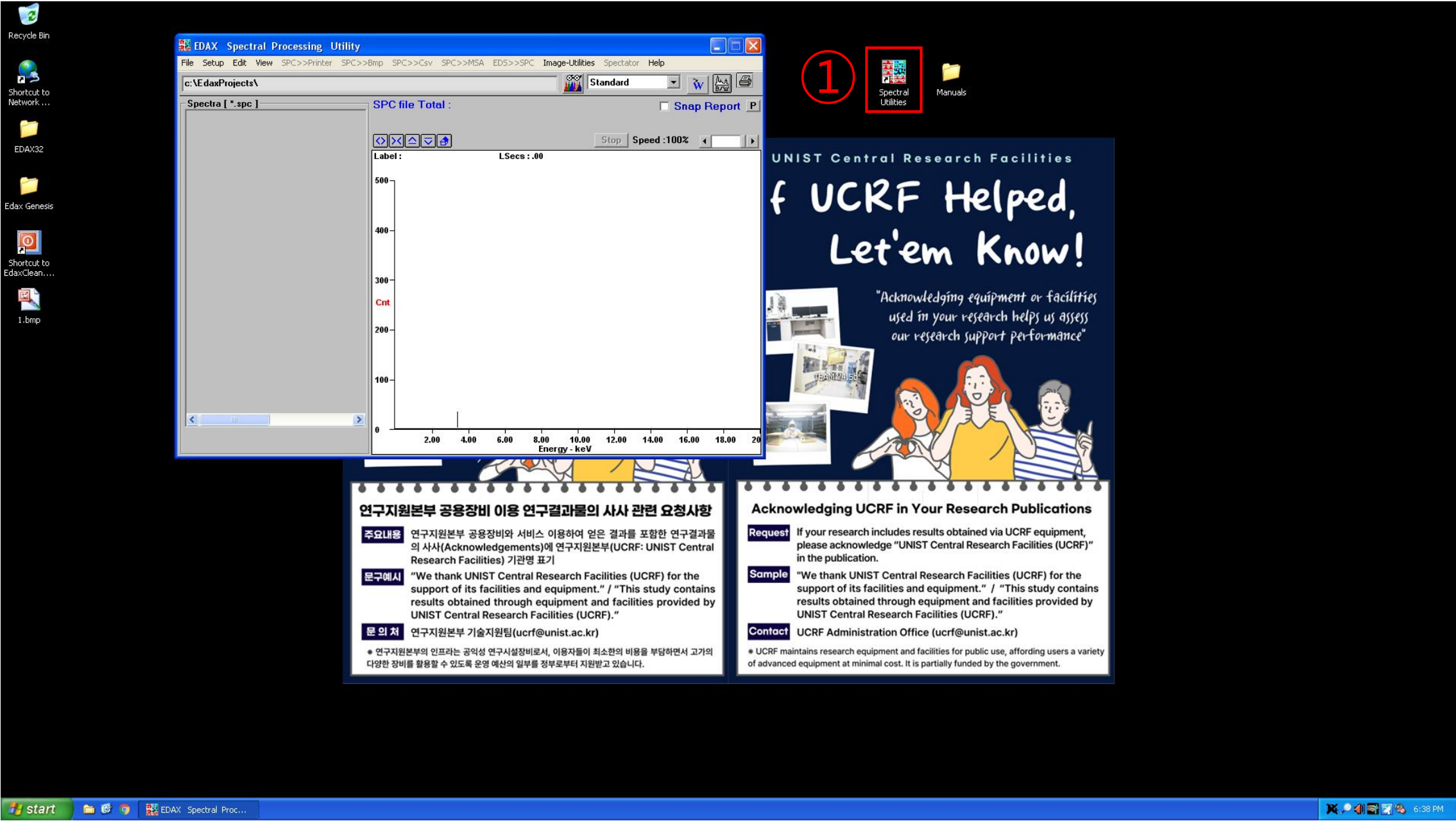


1. Click [Maps/Lines]
2. Repeat the spectrum analysis if you want to check which elements are present in the specimen.
3. Click [Maps]
4. Select the map type
5. Click right - select a matrix size, dwell and the data type
6. Click [Collect Maps X]
7. A dialogue box will open to select a file name and location to save the maps
[Desktop]-[EDS Data]-[Professor folder]-
[Individual folder]-[Date folder]



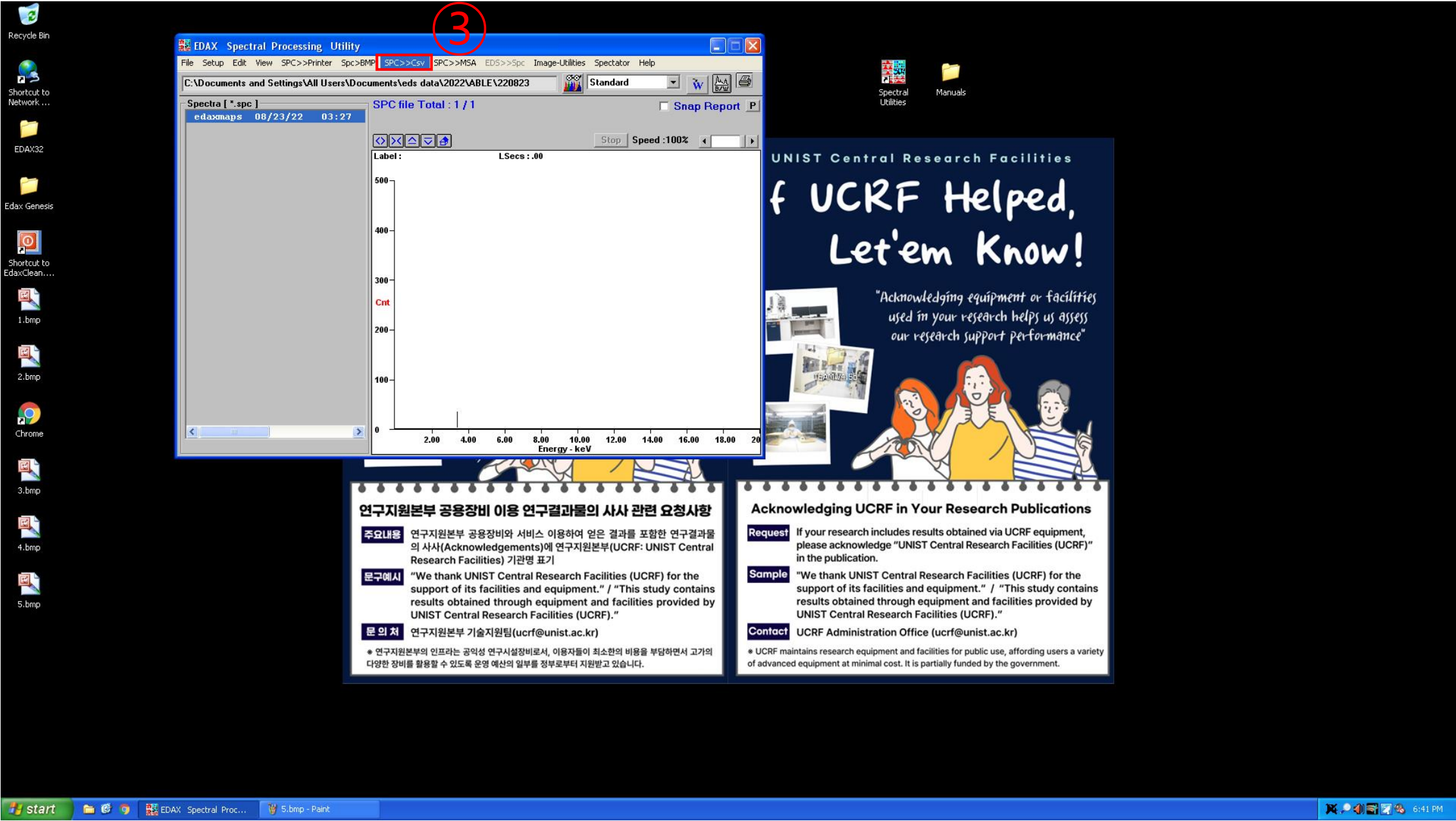
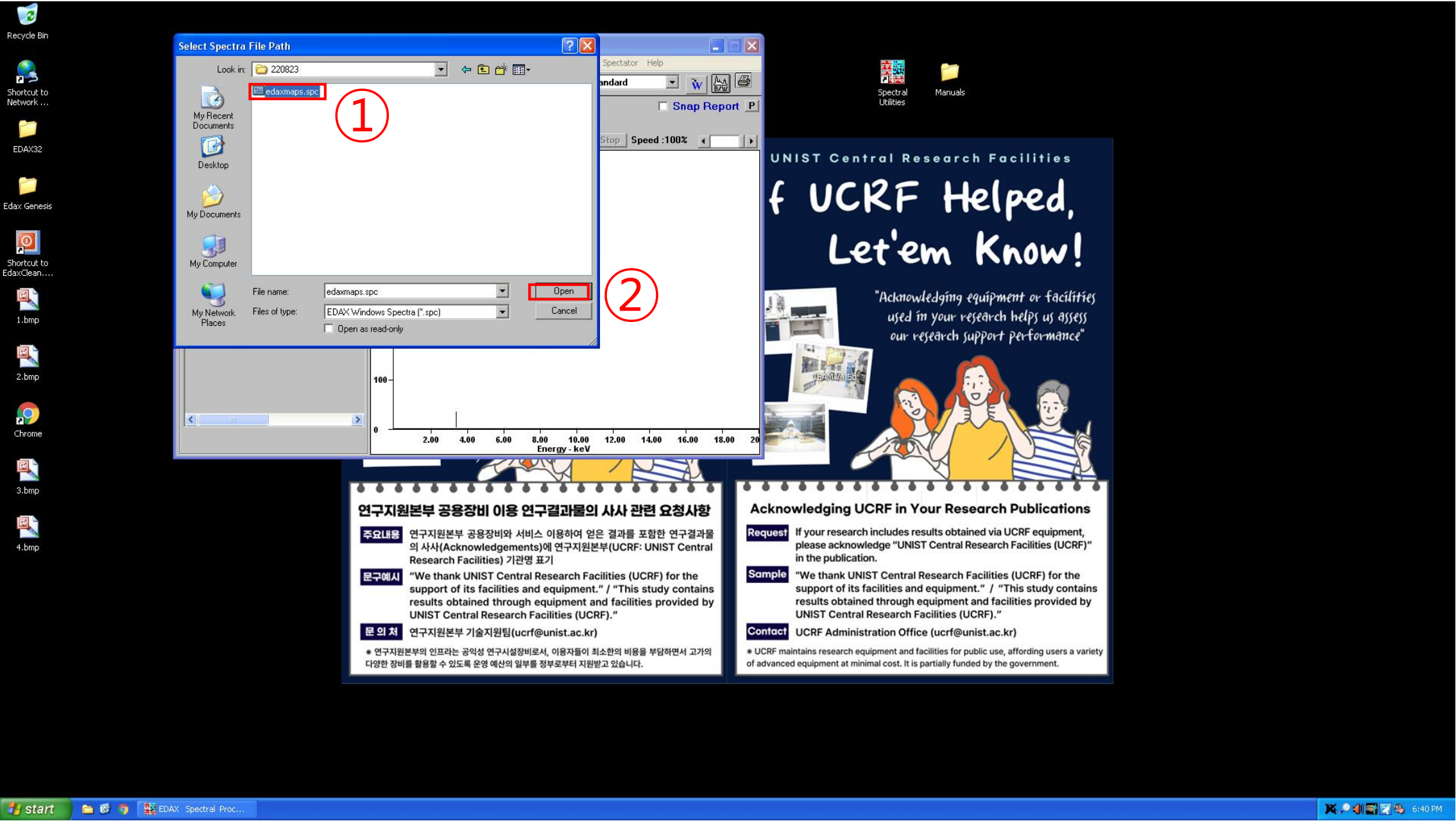
1. Click [Maps/Lines]
2. Repeat the spectrum analysis if you want to check which elements are present in the specimen.
3. Click [Line]
4. Select the line type
5. Click right - select a matrix size, dwell and the data type
6. Click [Collect Maps X]
7. A dialogue box will open to select a file name and location to save the maps
[Desktop]-[EDS Data]-[Professor folder]-
[Individual folder]-[Date folder]

Extracting EDS Data



1. Double click [Spectral Utilities]
2. Click [File]-[Open]

Extracting EDS Data



1. Find your spc data
2. Click [Open]
3. Click [Spc>Csv]

Energy Dispersive X-ray Spectroscopy

▪ EDS error

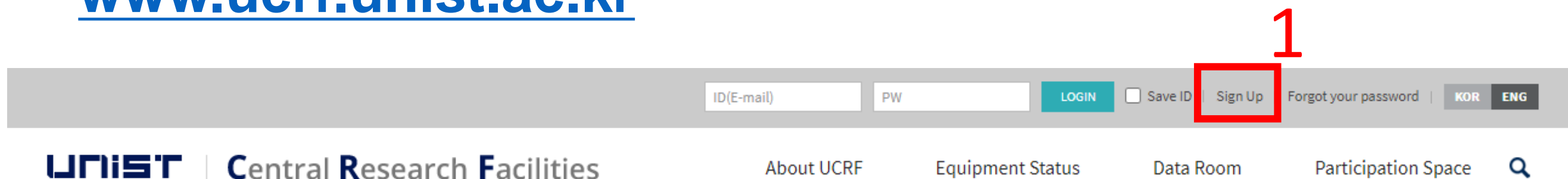
- 이미지가 안 불러와질 경우
 1. 책상 위 매뉴얼에 있는 순서대로 진행
 2. SEM, EDS 컴퓨터 재부팅
- Spectrum 이상
 1. CCD 화면 일시 정지인지 확인
 2. External 상태인지 확인
- Collection problem
 1. Please proceed in the order in the manual on the table
(Image collection problem)
 2. Please reboot both computers(SEM, EDS)
- Spectrum problem
 1. Please verify that the CCD screen is paused.
 2. Please verify 'scan-external' or not.

※ If the problem cannot be resolved, please contact the person in charge.

Request for Self-user

■ Create Account

www.ucrf.unist.ac.kr



The screenshot shows the top navigation bar of the UNIST UCRF website. The 'Sign Up' button is highlighted with a red box and a red number '1' above it. The navigation bar includes fields for ID(E-mail) and PW, a LOGIN button, a Save ID checkbox, a Forgot your password link, and language toggles for KOR and ENG.

1. Click [Sign up]
2. Click [UNIST Member]
3. Input [Portal ID/PW] → Click [Confirm]
Please check your information
4. Input professor name in [Principal Investigation]
→ Click [Professor search] → Click professor name
5. Click [Create Account]



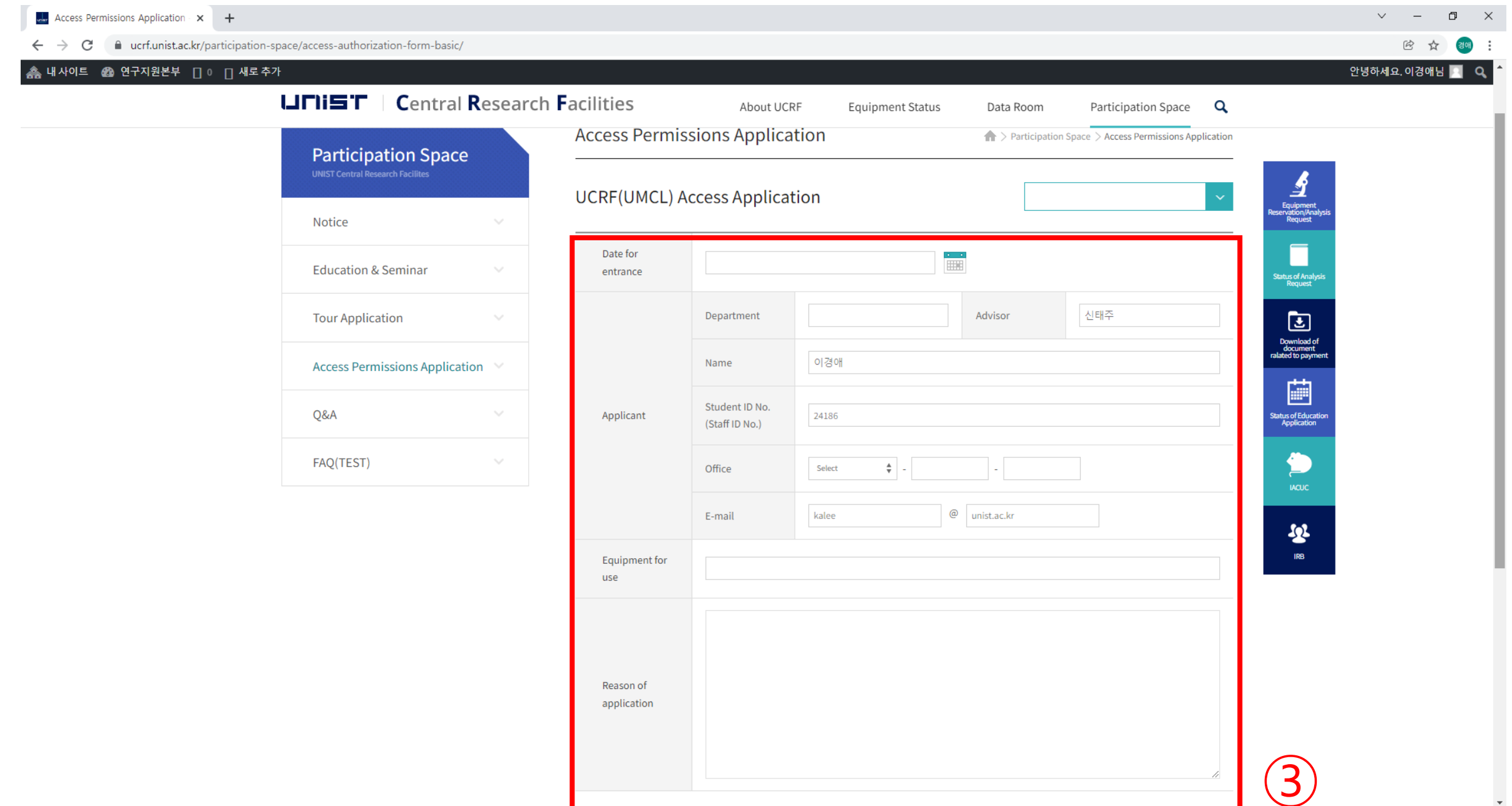
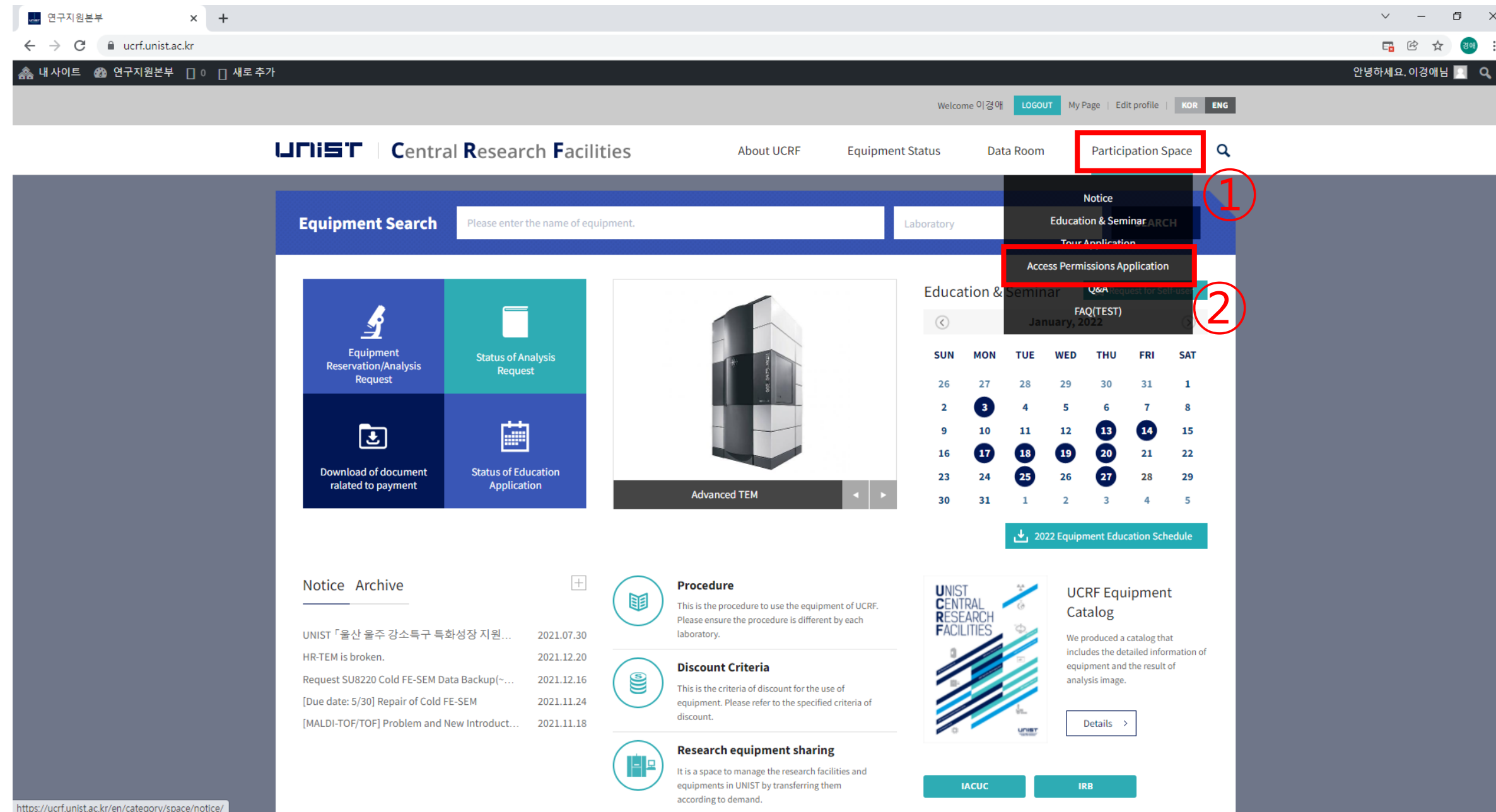
The screenshot shows the account creation form on the UNIST UCRF website. The form is divided into sections for member selection, login information, personal information, and professor selection. The following elements are highlighted with red boxes and numbers:

- 2**: The 'UNIST member' button in the member selection section.
- 3**: The 'Confirm' button in the login information section.
- 4**: The 'Professor Search' button in the principal investigator section.
- 5**: The 'Create Account' button at the bottom of the form.

The form fields include: ID/E-mail (m*k*m@unist.ac.kr), Password (masked with asterisks), Name (홍길동), Department (연구지원본부), Student ID No. / Professor ID No. / Staff ID No. (20*39), Contact (Extension: 4064, Cell phone: 010-**-**-**), and Principal Investigator (김교수).

Access Permissions Application

www.ucrf.unist.ac.kr



1. Click [Participation Space]
2. Click [Access permissions Application]
3. Fill out the UCRF(UMCL) Access Application form
4. Click [Apply]

- When reissuing the ID card, you must apply for access again on UCRF website.
- Access Authorization Officer: Kang Yeong-bi(4168)

Request for Self-user

The screenshot displays the UNIST Central Research Facilities website. The top navigation bar includes a 'My Page' link (1). The left sidebar features a 'Request for Self-user' link (2). A modal window titled 'Request for Self-user' is open, showing three dropdown menus: 'Materials Characterization Lab' (3), 'Electron Microscopy' (4), and 'SU7000 FE-SEM' (5). An 'Apply' button is highlighted (6). The background shows the 'Status of analysis request' page with a table of equipment.

Equipment	Status	Application date	Result of analysis	Print	Cancel
Materials Characterization Lab					
Electron Microscopy					
SU7000 FE-SEM					

After pass the test,

1. Login UCRF website (www.ucrf.unist.ac.kr)
2. Click [My Page]
3. Click [Request for Self-user]
4. Select [Materials Characterization Lab]
5. Select [Electron Microscopy]
6. Select [Quanta200 FE-SEM]
7. Click [Apply]

Reservation

portal.unist.ac.kr – Research Equipment – Equipment reservation/input result

The screenshot displays the UNIST Research Equipment reservation portal. The top navigation bar includes links for Home, Human Resources, Research Project, General Admin., Integrated Settlement, **Research Admin.**, Bulletin Board, U-Click, and Settings. The left sidebar lists various equipment-related functions, with **Reserve Equipment** highlighted. The main content area is titled 'Apply for Equipment Reservation' and features a 'Pull-down Search Menu' with filters for Reservation Date, 1st Classification, 2nd Classification, and Equipment Name. Below the search filters, there is a '관리자' (Admin) section and a 'List of Equipment Reservations' table. The table is currently empty, displaying the message 'The table does not contain any data'.

Apply for Equipment Reservation

Pull-down Search Menu

Reservation Date: 2021.01.... ~ 2021.10....
1st Classification: UMCL - 기기분석실
2nd Classification:
Equipment Name:
☒ Apply for Reservation ☐ Input Results ☐ Completed ☐ All ☐ 청구완료 ☐ 반려 ☒ 본인 장비만 보기

관리자

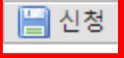
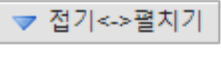
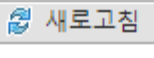
List of Equipment Reservations

Select	메모	Status	Application Classification	Equipment Name	의뢰자명	Chief of Research	Reservation Date	Reservation Time	Total	Subscriber	2nd Classification Name	1st Classification	Free_Test	Free_Longterm	Applying Date	예약번호
The table does not contain any data																

Reservation

portal.unist.ac.kr – Research Equipment – Equipment reservation/input result

장비예약

3   

장비선택

1 회원ID: kalee@unist.ac.kr 24186 / 이경애 예약자: 24186 이경애

대분류: UMCL - 기기분석실 중분류: Electron Microscopy 소분류: SU7000 FE-SEM

기준일자: 2021.07.22

예약제어정보

2

시간/날짜	07/22(목)	07/23(금)	07/24(토)	07/25(일)	07/26(월)	07/27(화)	07/28(수)	07/29(목)	07/30(금)	07/31(토)
09:00~09:30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
09:30~10:00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10:00~10:30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10:30~11:00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11:00~11:30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11:30~12:00	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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16:00~16:30	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16:30~17:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17:00~17:30	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17:30~18:00	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18:00~18:30	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18:30~19:00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19:00~19:30	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19:30~20:00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1. Select the classification and equipment
2. Select the time you want on white box
 - Yellow box : my reservation
 - Red box : others reservation
3. Click [Application]

Reservation cancel

portal.unist.ac.kr – Research Equipment – Equipment reservation/input result

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장비투어

Intellectual Property

Research Equipment(Common)

To-Do List

Reserve Equipment

Reserved Equipment Lis

자율사용 장비 현황

Equipment Status

담당자 일정 조회

운영비 지출

장비예약신청

조회조건

관리자

장비예약리스트

예약일자: 2021.07.... ~ 2021.07....

☒ 예약신청 ☐ 실적입력 ☐담당자승인 ☐책임자승인 ☐청구완료 ☐반려

대분류: UMCL - 기기분석실

중분류: Electron Microscopy

장비명: SU7000 FE-SEM

☒ 본인 장비만 보기

선택

메모

상태

신청구분

장비명

의뢰자명

연구책임자

예약일자

예약시간

사용료

예약자명

중분류명

대분류명

면제 구분

장기입실

신청일자

예약번호

1

V

예약신청

Self

SU7000 FE-SEM

2021.07.22

22:00~24:00

0

Electron Microscopy

UMCL - 기기분석실

2021.07.22 12:24

2021061388

예약신청

Self

SU7000 FE-SEM

2021.07.22

20:00~22:00

0

Electron Microscopy

UMCL - 기기분석실

2021.07.20 21:17

2021060863

예약신청

Self

SU7000 FE-SEM

2021.07.22

18:00~20:00

0

Electron Microscopy

UMCL - 기기분석실

2021.07.22 09:00

2021061306

예약신청

Self

SU7000 FE-SEM

2021.07.22

15:00~16:00

0

Electron Microscopy

UMCL - 기기분석실

2021.07.21 12:09

2021060969

UNIST

FIRST IN

Input result

After measurement, you have to input result instead of filling in log sheet

UNIST

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• To-Do List
• **Reserve Equipment**
• Reserved Equipment Lis
• 자율사용 장비 현황
• Equipment Status
• 담당자 일정 조회
• 운영비 지출

장비예약신청 도움말

조회조건

예약일자: 2021.07.... ~ 2021.07....
대분류: UMCL - 기기분석실
중분류: Electron Microscopy
장비명: SU7000 FE-SEM
☒ 예약신청 ☐ 실적입력 ☐담당자승인 ☐책임자승인 ☐청구완료 ☐반려
☒ 본인 장비만 보기

관리자

장비예약리스트

1 ☒ ☐ ☐ ☐ 신청 ☐ 수정 ☐ 삭제 **2** ☒ 실적입력 ☐ 변경 ☐ 승인 ☐ 실적요청 ☐예약공지

선택	메모	상태	신청구분	장비명	의뢰자명	연구책임자	예약일자	예약시간	사용료	예약자명	중분류명	대분류명	면제 구분	장기입실	신청일자	예약번호
1 <input checked="" type="checkbox"/>		예약신청	Self	SU7000 FE-SEM			2021.07.22	22:00~24:00	0		Electron Microscopy	UMCL - 기기분석실		<input type="checkbox"/>	2021.07.22 12:24	2021061388
<input type="checkbox"/>		예약신청	Self	SU7000 FE-SEM			2021.07.22	20:00~22:00	0		Electron Microscopy	UMCL - 기기분석실		<input type="checkbox"/>	2021.07.20 21:17	2021060863
<input type="checkbox"/>		예약신청	Self	SU7000 FE-SEM			2021.07.22	18:00~20:00	0		Electron Microscopy	UMCL - 기기분석실		<input type="checkbox"/>	2021.07.22 09:00	2021061306
<input type="checkbox"/>		예약신청	Self	SU7000 FE-SEM			2021.07.22	15:00~16:00	0		Electron Microscopy	UMCL - 기기분석실		<input type="checkbox"/>	2021.07.21 12:09	2021060969

1. Select the reservation
2. Click the [Input result]
3. Check the information and click [Save]

Guideline of the operation of the UCRF UMCL

Article 1. Access

- ① A person who wishes to be authorized access to UMCL must obtain approval from the manager in charge after submitting an application form to “Access Permissions Application” of the “Participation Space” menu on the UCRF homepage (<http://ucrf.unist.ac.kr>).
- ② A person who wishes to enter UMCL without access authority shall be accompanied by the equipment manager or shall obtain approval for access from the equipment manager.
- ③ Each user must enter (exit) individually using the pass card with their own identity, and it is prohibited to enter using another person's pass or to enter together without permission.
- ④ A person who uses UMCL at night (PM18-AM09 on the next day) or on holiday must enter after establishing personal safety and protection rules (accompanying 2 or more people, preparing for an emergency contact, etc.) for lab accidents.
- ⑤ A person who violates above paragraph ①~④ regarding access to UMCL shall be obligated to compensate for all safety and property damage caused by the violation.

Article 2. Use of laboratory space

- ① A UMCL user must understand and follow the common safety rules for the laboratory (Attachment 1).

Guideline of the operation of the UCRF UMCL

- ② A UMCL user on weekends or holidays must fill out the laboratory daily checklist (Attachment 2) provided in each laboratory room, and must submit it to equipment manager, with the signature of the professor(or supervisor) within 3 days from the date of use.
- ③ A UMCL user should clean up the area after using the equipment, and must promptly notify the equipment manager if there is any problem with the equipment or environment. Violation of the notification obligation may result in restrictions on the use of the equipment.

Article 3. Use of Equipment

- ① A person who wishes to use the equipment of UMCL must make a reservation and use the equipment after completing the training of the equipment manager, assessment test, and acquiring self-user qualification. (Analysis or process request is irrelevant to equipment training and qualification evaluation.)
- ② A user who completes the regular or occasional training (including practice) by the equipment manager can receive practical training from the senior student of his or her laboratory to improve proficiency before the assessment test. The qualification of the senior must be at least 1 year of experience (more than 5 times in the previous 6 months) in using the equipment. The laboratory is responsible for all safety and property issues arising from the practical training conducted by the senior student.

Guideline of the operation of the UCRF UMCL

- ③ If there is no record of equipment used in the last 90 days, the qualification for self-use ends. A person who wants to reacquire the self-user qualification must receive equipment training and pass the assessment test conducted by the equipment manager. The upgrading for self-user can be made on the website of UCRF. (<http://ucrf.unist.ac.kr>)
- ④ Equipment reservations or requests can be made on the UNIST Portal System and the website of UCRF, and the reservation time should not be unnecessarily occupied for a long time so it does not affect the opportunity for others.
- ⑤ A user should be familiar with the safety rules for each equipment before using, and use the equipment after wearing appropriate safety gear.
- ⑥ Bringing chemicals and other items for personal use should be consulted with the equipment manager.
- ⑦ A user must check that there is no problem before using equipment, chemicals, and etc. If there is a problem before or after use, a user should promptly report to the equipment manager.
- ⑧ A user must thoroughly fill out the “Performance Records” after using the equipment.
- ⑨ A user must take safety measures by posting the contents of the experiment to deliver accurate information to others if he inevitably leaves his seat during the experiment.
- ⑩ The laboratory(in case of outsiders, affiliated institution) of self-user shall be obligated to compensate for all safety and property damage such as accidents (equipment damage, breakdowns, losses, etc.) caused by the negligence of the self-user.

Guideline of the operation of the UCRF UMCL

Article 4. Cancellation after equipment reservation

- ① A self-user can cancel equipment reservation by himself up to 2 hours before equipment reservation time. However, TEM (HR-TEM, FE-TEM, Normal TEM, Bio-TEM) can be canceled up to 4 hours before. (※ Cancellation is not possible after the cancellation deadline has passed.)
- ② If a user has reserved an analysis request but wants to cancel it, he must notify the equipment manager at least 24 hours in advance. (However, in the case of NMR, notification would be allowed up to 1 hour left.) A user who does not appear at the reservation time without prior notice will be charged a usage fee for the reservation time.

Article 5. Laboratory safety and user management

- ① A person who harms the safety of the laboratory or violates the rules of using the UMCL and damages the equipment use of another person, can be subject to penalties according to [Attached Table 1] and be taken appropriate action.
- ② If the violation of the rules is deliberately determined, the sanctions may be strengthened. If a user voluntarily declares after violating the rules, the sanctions may be eased.
- ③ If it is judged that the sanctions are difficult to be properly implemented due to the status of the violator (graduation or resignation), the user may be blocked from accessing UMCL.

Guideline of the operation of the UCRF UMCL

- ④ A person who damages the property and facilities of UMCL by violating the rules shall be held liable to compensate for the damage.
- ⑤ If a violator does not follow the sanctions, the advisor of the violator will be held jointly responsible. (In the case of an outsider, the supervisor in charge of the affiliated institution)

Self-user Penalty

1. Criteria for penalty points

① A user shall be fined the penalty points in the event that any inappropriate behavior falls under the following. Each penalty item may be counted multiple times. (The expiration of penalty points is 1 year from the date of imposition.)

No.	Case description	Penalty points
1	Equipment is used by an unpermitted user who does not have a qualification of self-user.	5
2	Equipment is used without reservation (Including excessive use of equipment without additional reservation	3
3	A user operates an unpermitted function of the equipment	3
4	An abnormality or malfunction discovered before or after using the equipment did not immediately reported to the manager	3
5	Damage, malfunction, and loss of equipment due to user negligence (* The user is responsible for all costs incurred due to the negligence. *)	5
6	A user does not provide the accurate information of the sample to the equipment manager, which is essential for protecting the safety, equipment or facilities	3
7	A person causes the leakage of a harmful substance, gas, or any risk of fire	5
8	A person uses or occupies the public items and other person's items without prior consent	1
9	A person leaves the laboratory without switching off the lights, locking the doors, tidying up the area, etc. after using equipment	1
10	A person does not follow the common lab safety rules (including clothing, prohibition of eating, etc.)	1

Self-user Penalty

2. Actions taken after subjecting penalty points

- ① If the cumulative penalty points exceed a certain criterion, the action corresponding with the table below will be taken.
- ② When a user violates the rule, an official letter from UCRF is sent to the department or institution(in case of the user outside) of the violator.
- ③ Even if the following actions have been taken due to the sum of the penalty points, the penalty points within the validity period(1 year) are effective.

Type	Penalty points	Action
Total penalty points awarded to 1 user	5 points or more	- The user is prohibited from using the equipment for 1 month. - When the prohibition period is finished, the user must complete the training and assessment again.
	8 points or more	- The user is prohibited from using the equipment for 3 months. - When the prohibition period is finished, the user must complete the training and assessment again.
Total penalty points awarded to 1 laboratory for 1 equipment	12 points or more	- Notify the user and the advisor(supervisor) by e-mail that "If the penalty score is more than 15 points, the members of your laboratory are prohibited from using the equipment for 1 month."
	15 points or more	- The members of the laboratory are prohibited from using the equipment for 1 month - Send an official letter of action to the affiliated department(institution)



THANK YOU

FIRST IN CHANGE