

		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

COMPANY PROFILE

Revisions :

Revision	Date	Initials	Comments
1	Apr 11, 2016	G.A KANG	First Draft
2	Sep 12, 2016	G.A KANG	Update
3	Jun 12, 2019	G.A KANG	Update
4	Aug 5, 2022	G.A KANG	Update
5	Aug 31, 2022	G.A KANG	Update

References :

Ref No.	Documents ID	Initials

PDC TECHNOLOGY
 41, Bupyeong-ro, Jinjeop-eup, Namyangju-si, Gyeonggi-do, KOREA
 Phone : +82-70-4324-0810

		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

1. SUMMARY

- 1.1 President : Jake Choi
- 1.2 Business Area
- 1.3 Contacts : pdctech@pdctech.co.kr

2. HISTORY

3. ORGANIZATION

- 3.1 Organization (PDC)
- 3.2 Organization (Consortium)

4. PRODUCT

- 4.1 Sample Environment Equipment for XRD
 - 4.1.1 In-Situation Battery Cell (ISBC)
 - 4.1.2 Battery Environment System (BES)
 - 4.1.3 In-situ High Pressure System (ISHPS)
 - 4.1.4 In-situ High Temperature System (ISHTS)
 - 4.1.5 In-situ Pouchcell for Solid Electrolyte (ISPSE)
 - 4.1.6 In-situ Flow Cell (ISFC)
 - 4.1.7 Vision Align System (VAS)
 - 4.1.8 Manual 3-Axis Stage
- 4.2 Sample Environment Equipment for Neutron
 - 4.2.1 In-Situ high temp. vacuum chamber for Bio-Reflectometer
 - 4.2.2 In-Situation battery cell for SANS
 - 4.2.3 In-Situation battery cell with heating
 - 4.2.4 In-Situation battery cell (32mm specimen)
- 4.3 In-Situation Heating Stage for FIB or SEM (ISHS)
- 4.4 Effusion Cell for Evaporator
- 4.5 Equipments for Semi-conductor or FPD(Flat Panel Display)
 - 4.5.1 PECVD for OLED Encap
 - 4.5.2 Dry Asher for OLED Mask
 - 4.5.3 6G Moving System
 - 4.5.4 3-Axis Multi-Loader for half 5G Sputterr
 - 4.5.5 RnD Evaporator

5. OUR STRENGTH

		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

1. Summary

1.1 President : Hyunbum Choi

1.2 Business Area

1.2.1 Equipment Quarter

PECVD : Semiconductor, OLED Encap, LCD

Evaporator : CIGS solar cell, OLED, Metal Evaporation

Effusion Cell : Linear, Point & Several sizes of cell

1.2.2 Module & Customizing Quarter

In-situation System : Battery(ISBC), Heating, moving in vacuum

Vacuum System for R&D

Cooling System for R&D

Supply System, Loader System etc

1.3 Contacts : pdctech@pdctech.co.kr

82-10-4084-4442

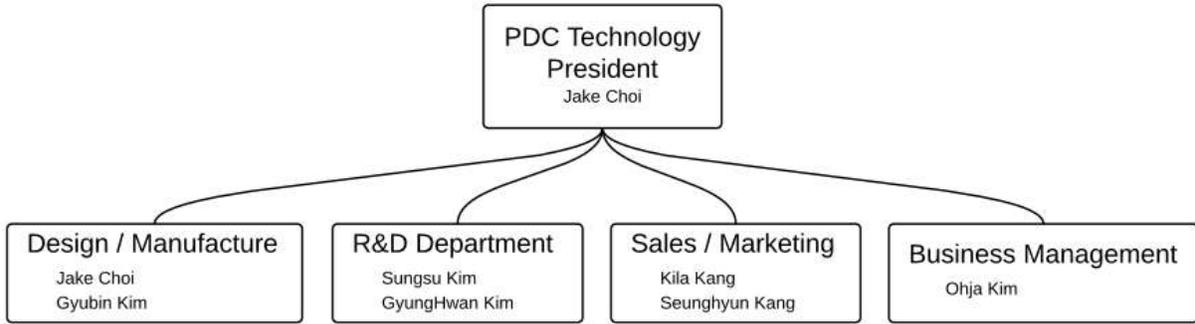
2. History

- 2006. Established
- 2009. CIGS Evaporator System
- 2010. GS-Nanotech, Jusung-Eng, Dongjin-Semichem Partnership
KIST(Korea Institute of Science and Technology) OLED Encap PECVD orders
- 2011. Wonik-IPS OLED Encap PECVD orders
- 2012. Development of In-situation Heating Stage System for SEM & FIB
- 2013. National Project - "Top-down Linear effusion cell development"
- 2014. Development of In-situation Battery Cell System for XRD
- 2015. Development of Evaporator System for OLED R&D - EV5000
- 2016. 11G PECVD : golf-tee project
6G LTPS : heater demo test kit, moving & feedthru R&D
Effusion point cell
Manual Loader
- 2018~. In-situation system for neutron & XRD

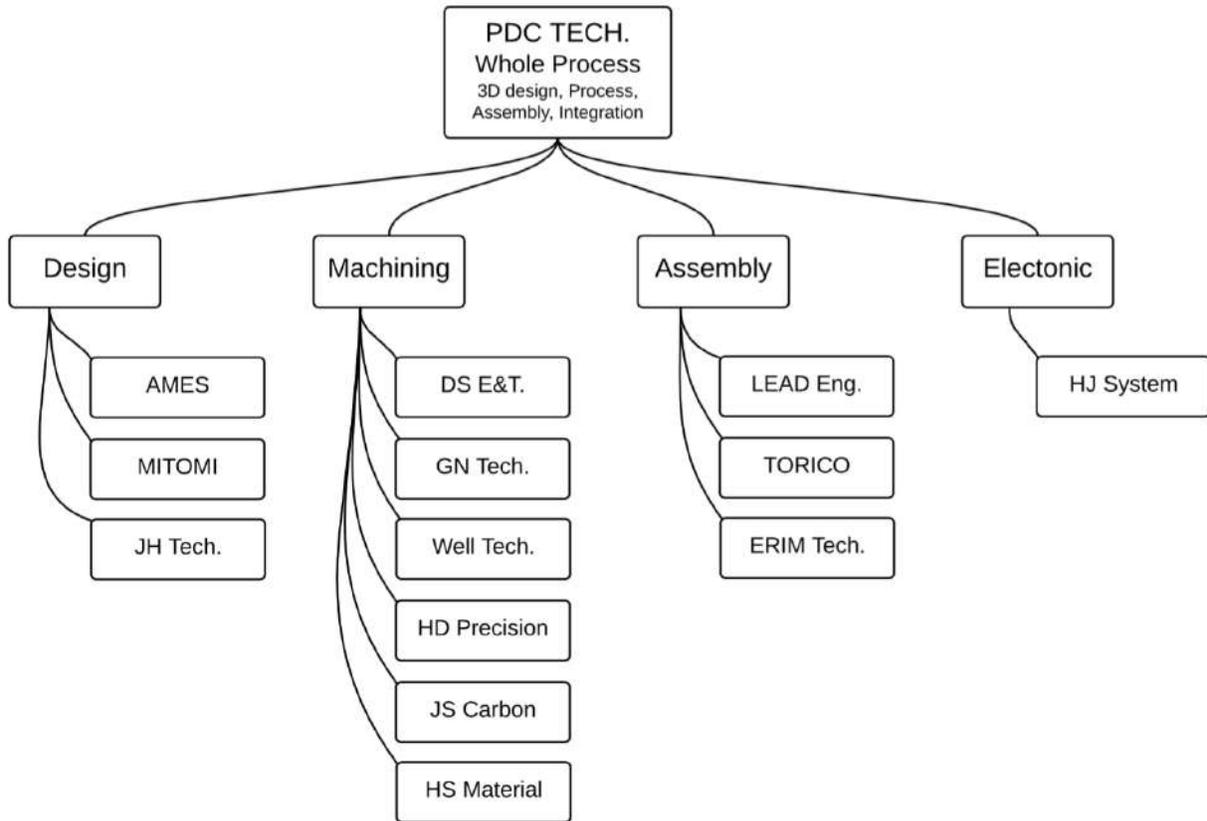
		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

3. Organization

3.1 Organization (PDC)



3.2 Organization (Consortium)

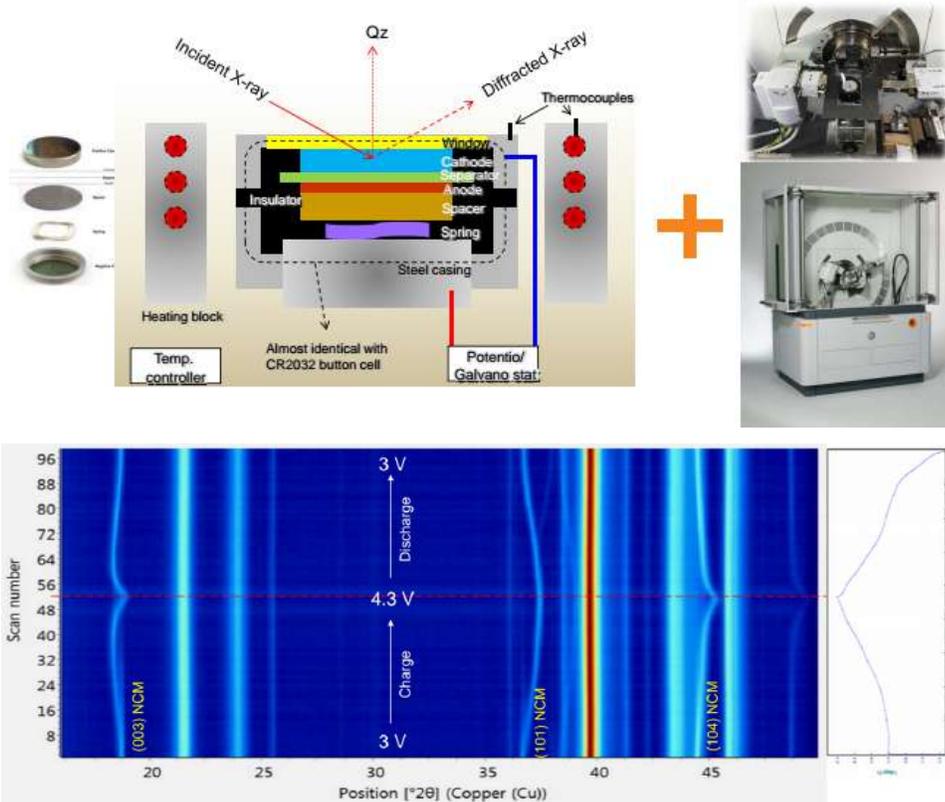


		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

4. Product

4.1 Sample Environment Equipment for XRD

4.1.1 In-Situation Battery Cell (ISBC)



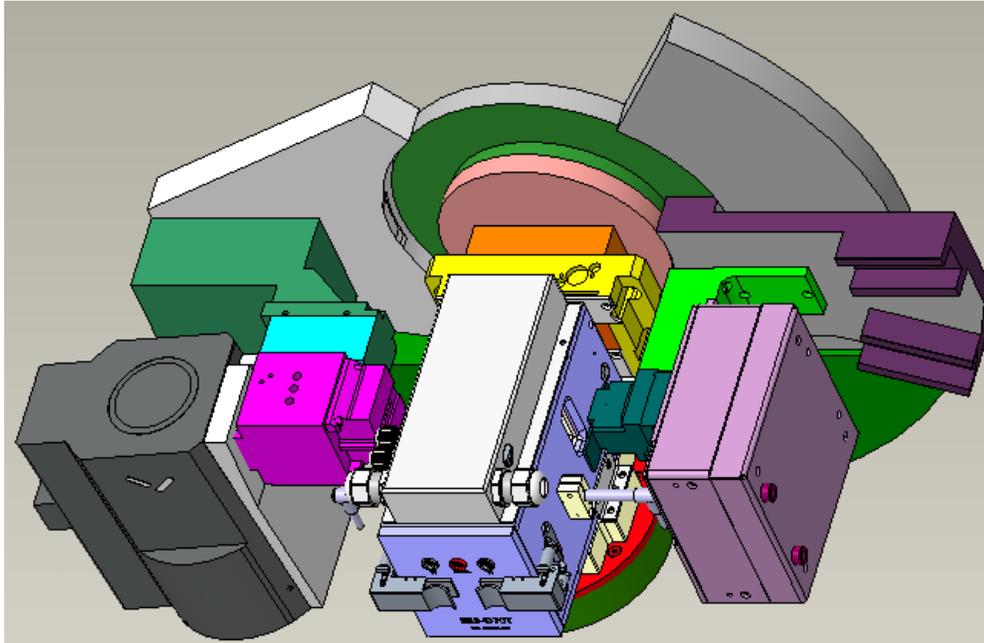
It is important to study the mechanism of the positive/negative electrode material when studying materials in secondary Li-ion batteries. In particular, the anode/cathode reactions which is occurred charging and discharging are particularly important. XRD is a good way to analyze the structure of the materials in secondary Li-ion batteries. However, It is hard to measure at the same time while performing the charging and discharging.

“In-situ XRD Analysis System” makes it possible to measure these changes.

- Measurement Range : Incident Angle(θ) from 5 / 7°
- Material of Current Collector : Be sheet / SUS316L
- Number of Poles : 2 poles
- Temperature Range : -10 ~ 70°C

		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

4.1.2 Battery Environment System (BES)

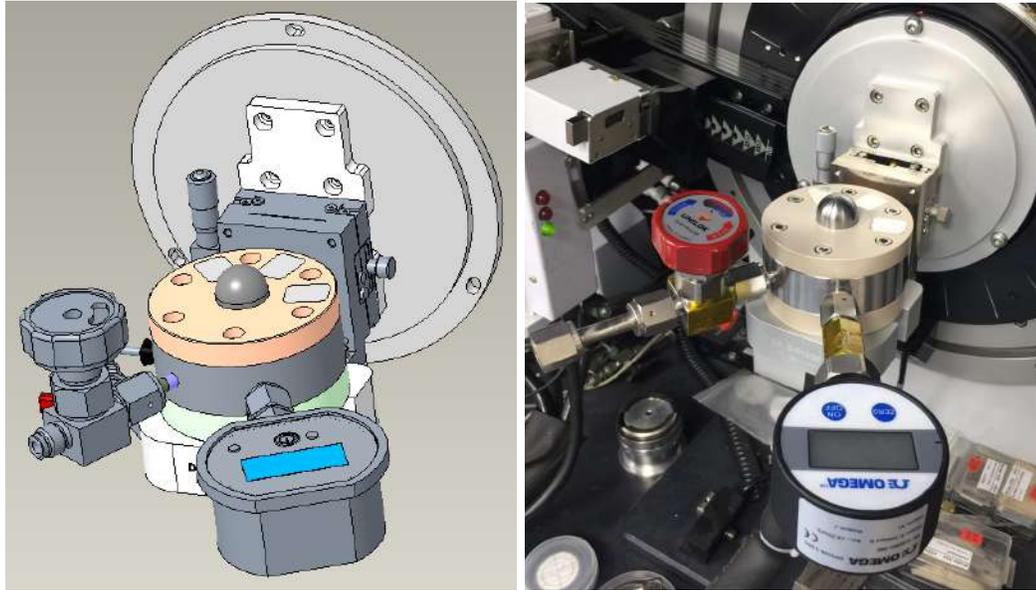


This equipment is an in-situ system for XRD. It is possible to carry out XRD transmission analysis at the same time charging/dia-charging while realizing the environment to reality temperature. At the same time the change in the thickness of the battery can be measured using a thickness gauge.

- Temperature range : -10 ~ 70 °C
- Cooling system : PCW + PELTIER
- XRD system : EMPYREAN (Ag + Galifix)

		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

4.1.3 In-situ High Pressure System (ISHPS)



This device is an in-situ pressure system for XRD. It is a device to observe the structure of the specimen by changing the pressure inside the chamber. At the same time, the temperature in the chamber can be changed with the circulator. The dome made by Be metal can pass through the X-ray with minimal beam loss.

- Temperature range : -10 ~ 70 °C (amp ~ 400°C, option)
- Max. Pressure : 150 bar
- XRD system : EMPYREAN / BRUKER D8 (Cu source)

		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

4.1.4 In-situ High Temperature System (ISHTS)

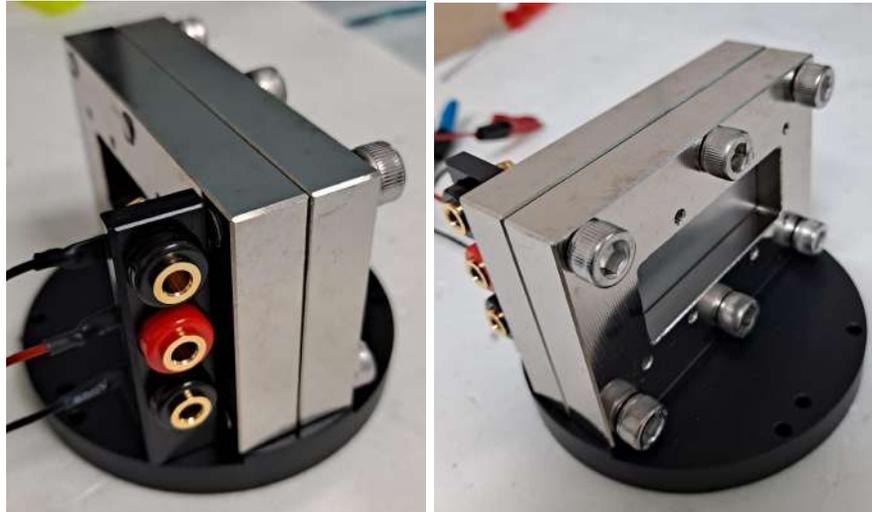


This device is an in-situ high temperature system for XRD. It is a device to observe the structure of the specimen by changing the temperature.

- Temperature range : RT ~ 500 °C (Cell base)
- Using Coin-cell.
- XRD system : XPRT (Mo source)

		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

4.1.5 In-Situ Pouchcell for Solid Electrolyte (ISPSE)

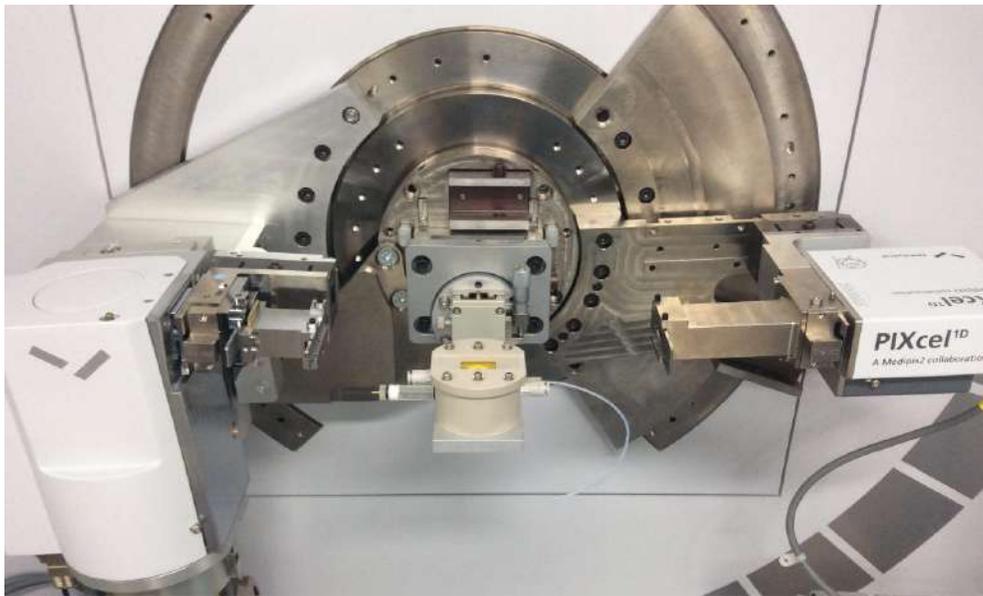
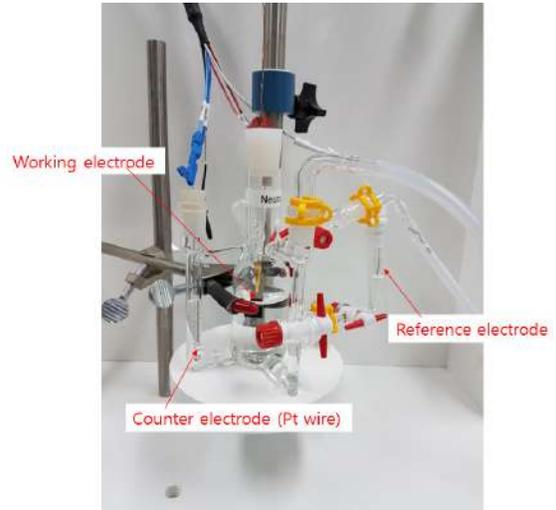
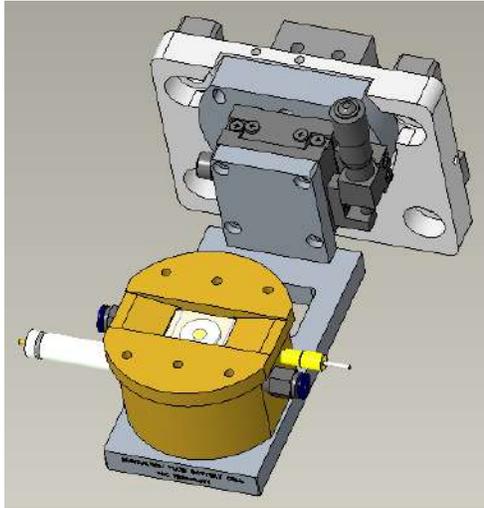


This device is an in-situ high pressure system for solid electrolyte. It is a device to observe the structure of the material under high pressure.

- Pressure range : 0 ~ 300 bar
- Using Pouch-cell.
- XRD system : EMPYREAN (Mo source)

		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

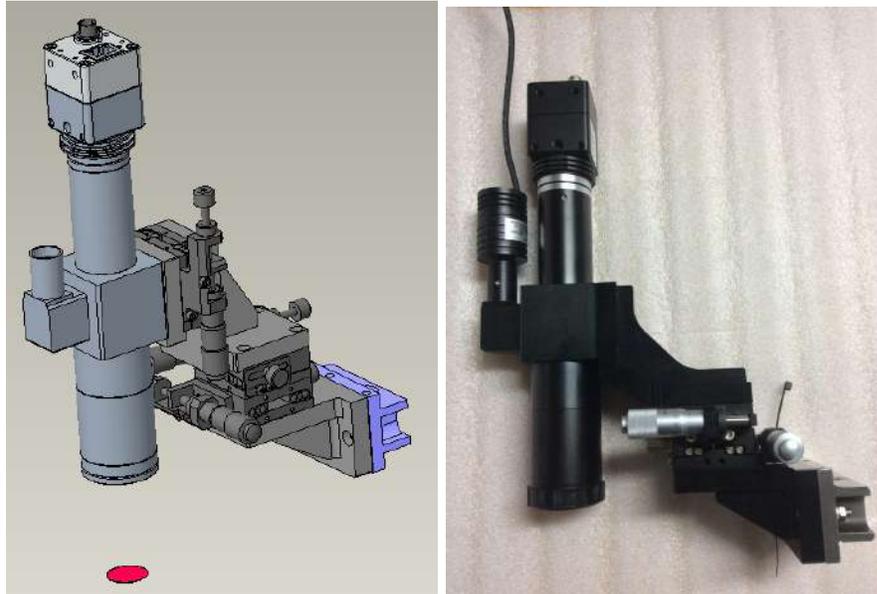
4.1.6 In-situ Flow Cell (ISFC)



- XRD system : EMPYREAN (Cu source)

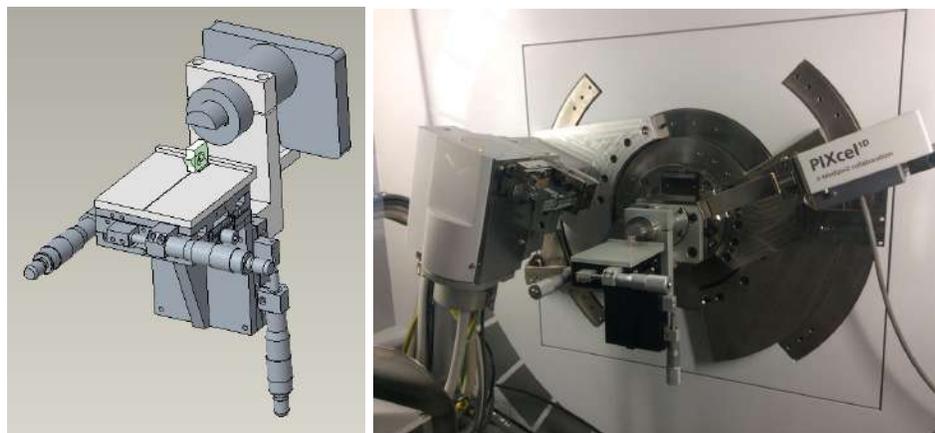
		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

4.1.7 Vision Align System (VAS)



- XRD system : EMPYREAN (Cu source)

4.1.8 Manual 3-Axis Stage

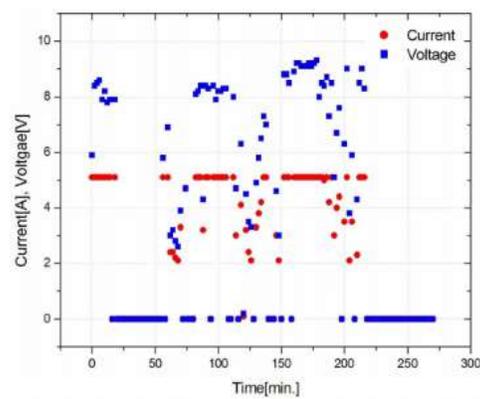
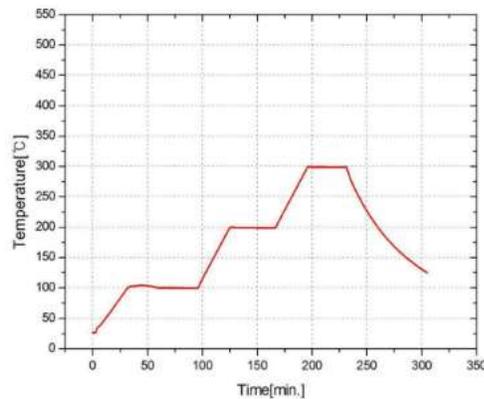
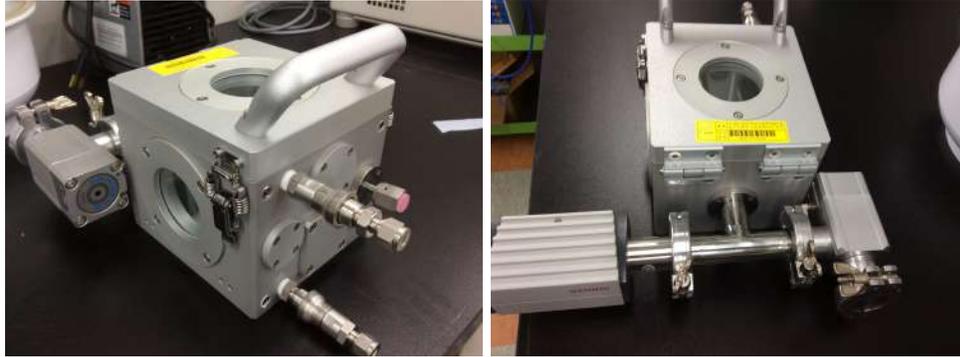


- XRD system : EMPYREAN (Cu source)

		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

4.2 Sample Environment Equipment for Neutron

4.2.1 In-Situ high temp. vacuum chamber for Bio-Reflectometer



Bio-reflectometer in 'HANARO' that is the research reactor in Korea is the equipment for bio-thin film sample. This system is the in-situation high vacuum heating stage for Bio-reflectometer using in 'HANARO'. It can be also have used in XRD by changing windows.

"In-situation high temp. vacuum chamber" is the only equipment for bio-reflectometer in Research reactor, HANARO.

- Heater size : >Ø3 (inch)
- Temperature range : >350 °C ± 1%
- Cooling system : PCW in whole chamber
- Incident Angle(θ) from -10° to 50°
- Semi-auto control system

		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

4.2.2 In-Situation battery cell for SANS

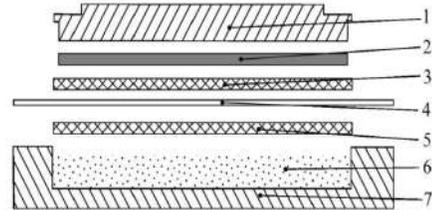
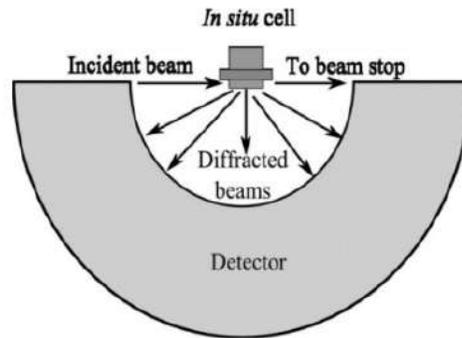
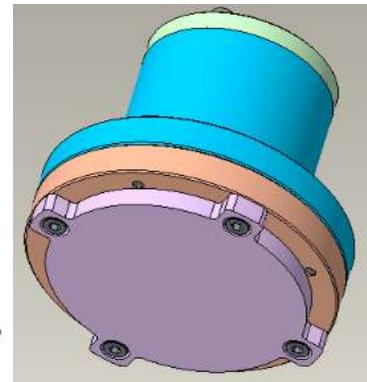
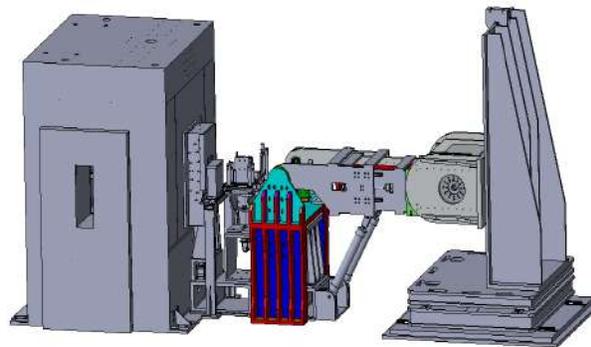


Figure 3
 Expanded cross section of the electrode assembly: (1) negative current collector, (2) lithium counter-electrode, (3) glass fibre separator, (4) polymeric (Celgard) separator, (5) glass fibre separator, (6) active material, (7) positive current collector and sample holder.

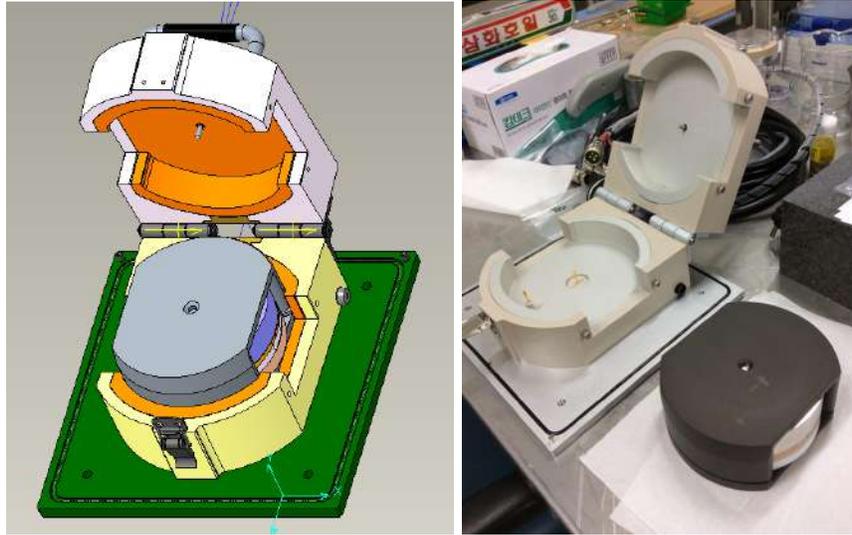


The In-situation battery experiment with neutron is very attractive because It has been able to observe Li directly. Using the in-situ technology, we have developed a device for the in-situation experiments in the field of battery with “KAERI”. Not only in the battery field, we have been developing a bio, cryogenic equipment, and magnetic experiment apparatus for the in-situation neutron system.

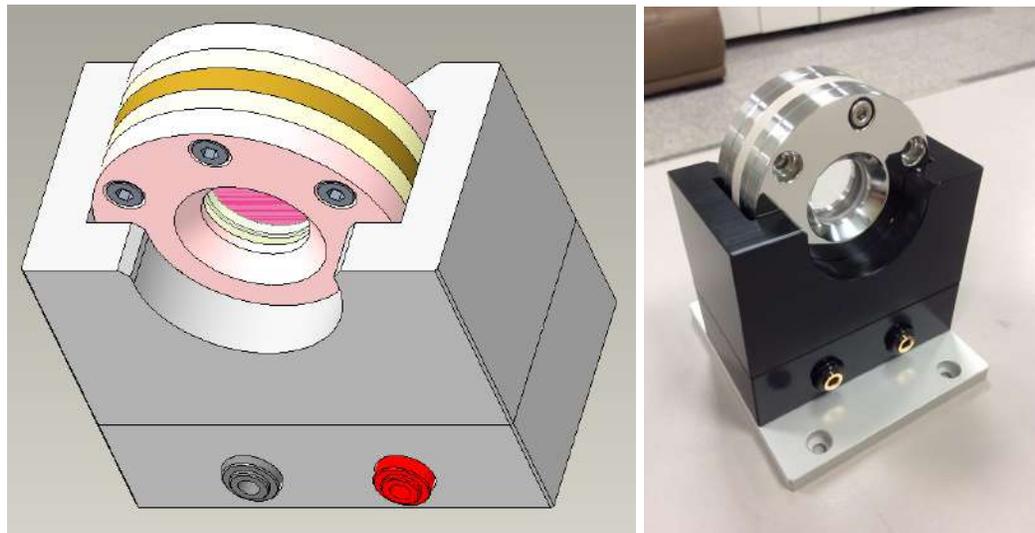
- Incident Angle(θ) from 0° to 10°
- PEEK and Aluminum body

		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

4.2.3 In-Situation battery cell with heating

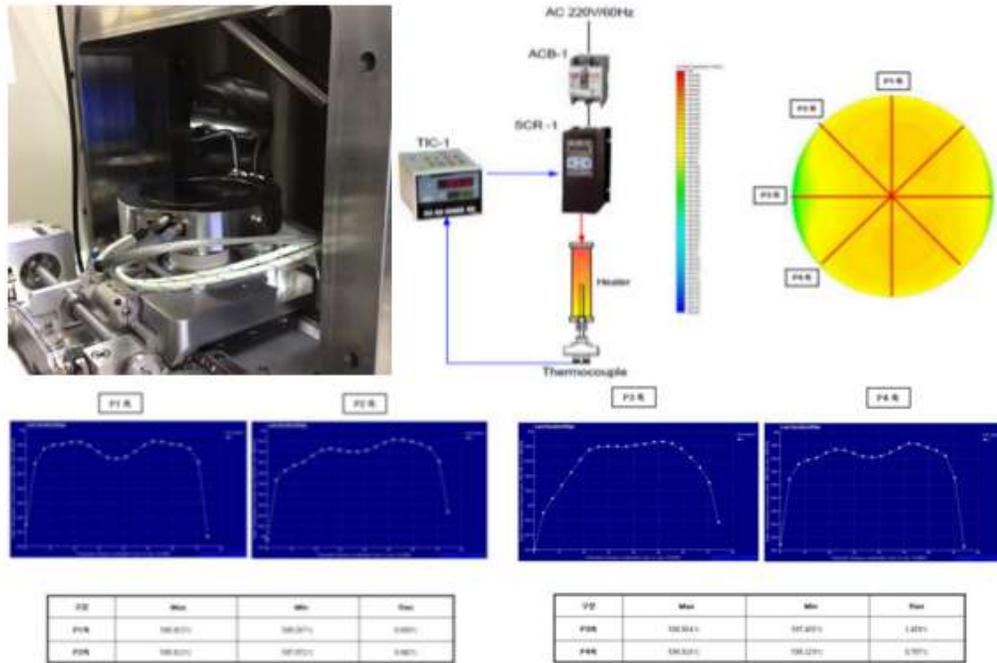


4.2.4 In-Situation battery cell (32mm specimen)



		Company Profile		Docu Code: PDC-MP11
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4.3 In-Situation Heating Stage for FIB or SEM (ISHS)



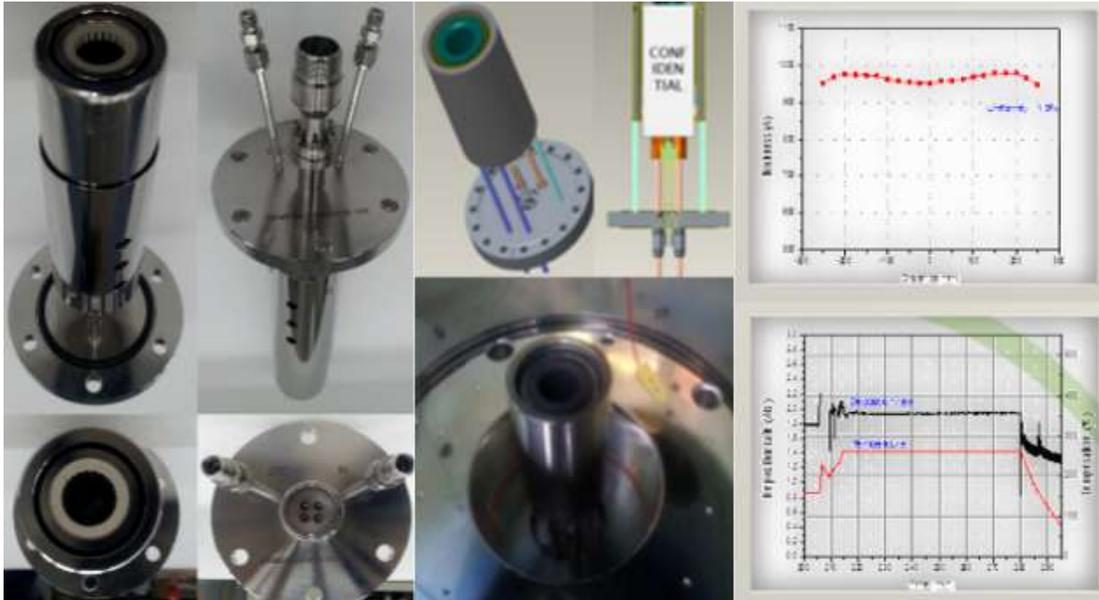
Some scientists & engineer want to control temperature when they measure some species for SEM or FIB. They are UHV environment and the stage is high accuracy system. The temperature influence each parts, gun, stage and chamber, especially stage. It is nano-meter scale movements.

"In-situ Heating Stage System" is the best solution of high temperature stage for SEM & FIB.

- Heater size : >Ø85 (mm)
- Temperature range : >600 °C ± 1.5%
- Cooling system : PCW
- Vacuum Range : > 10⁻⁷

		Company Profile		Docu Code: PDC-MP11
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4.4 Effusion Cell for Evaporator



Effusion cell is the equipment to evaporate materials by heating it in a crucible to deposit thin films at substrate. These products are used for OLED display and CIGS solar cell. Organic and metal effusion cells are extended for vacuum coating field because of their excellent performance.

- Organic point cell : 10 ~ 400cc, Max. 600°C
- Metal point cell : 10 ~ 400cc, Max. 1600°C

		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

4.5 Equipments for Semi-conductor or FPD(Flat Panel Display)

4.5.1 PECVD for OLED Encap

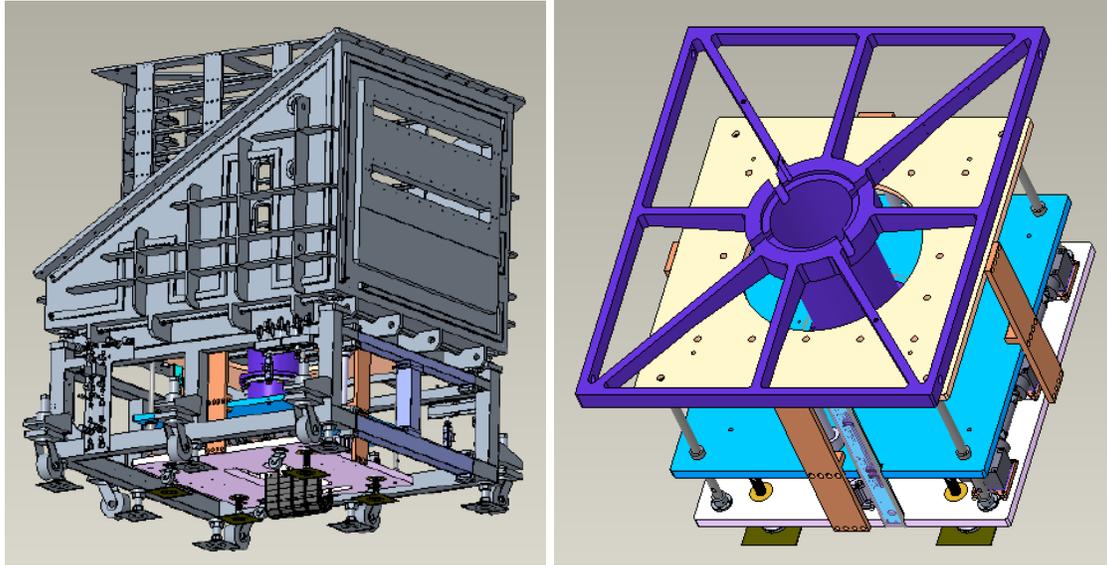


4.5.2 Dry Asher for OLED Mask

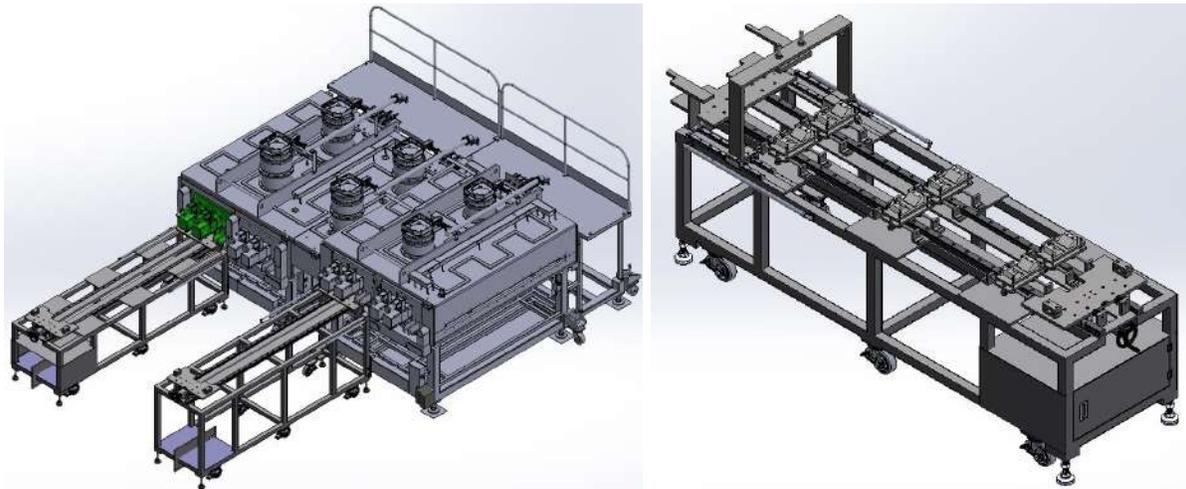


		Company Profile		Docu Code: PDC-MP11
Date: Aug 31, 2022	Product Code:	Prepared by: G.A KANG	Approved by: JAKE CHOI	Version: 05

4.5.3 6G Moving System



4.5.4 3-Axis Multi-Loader for half 5G Sputter



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4.5.5 2G RnD Evaporator



5. Our Strength

- The vacuum handling and automation experts
- The flexible organization (based on consortium)
- Various R&D experiences with national labs, and university labs.
- Highly understanding on analytical equipment (SEM, FIB, XRD, XRF, Neutron etc)
- Easily offer of custom devices for high technology
- High quality, Accurate delivery, Reasonable cost