

# BATTERY ASSEMBLY AND CHARACTERIZATION

## CELL ASSEMBLY

Ar-filled glove boxes (LABstar pro, Mbraun):

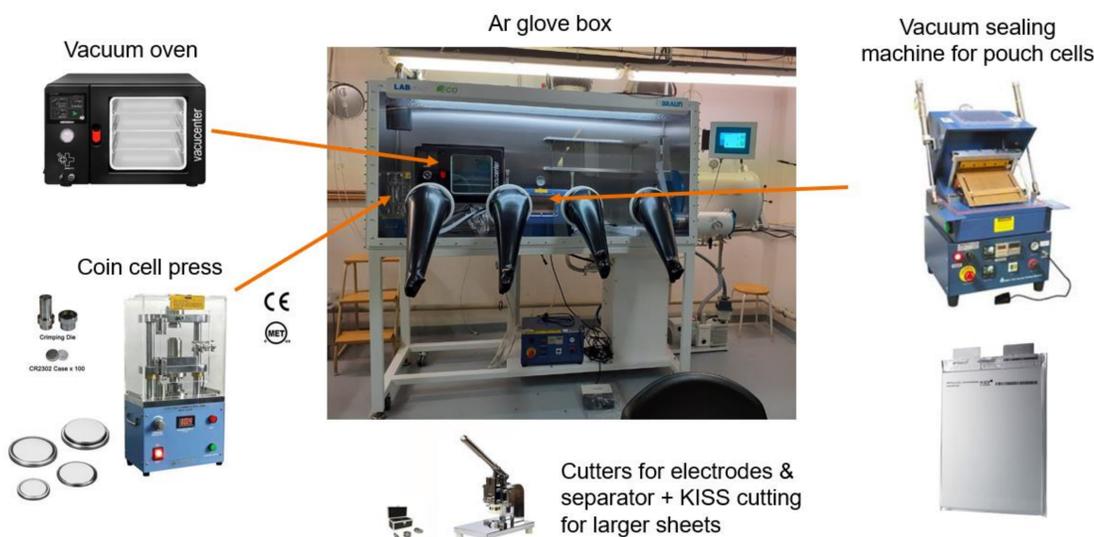
- 4-glove box for coin & pouch cell assembly and metallic Li processing
- 2-glove box for coin cell assembly and metallic Na processing

CR2016 and CR2032 coin cell cases (MTI & Hohsen)

- Disc electrode sizes 10-24 mm diameter
- Pouch electrode sizes
  - Small:  $17 \times 22 \text{ mm}^2 = 3.74 \text{ cm}^2$  / layer
  - Big:  $37 \times 68 \text{ mm}^2 = 25.16 \text{ cm}^2$  / layer

Sealers:

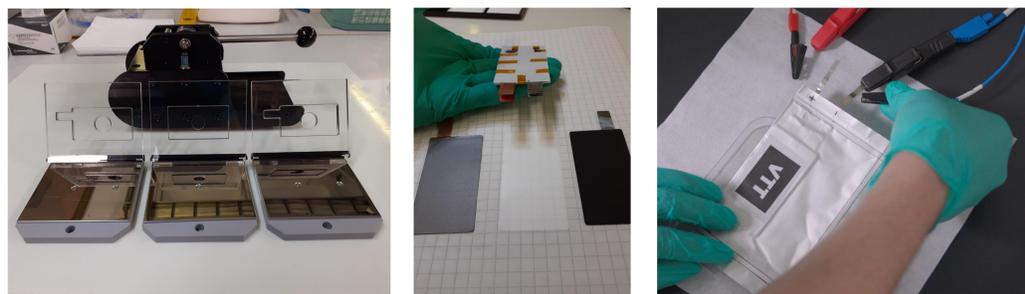
- MSK-115-III Vacuum Sealer in Ar filled glove box (MTI)
- PSS96 Star Industrial Heat Sealer in ambient conditions (PackSealer)



## 3-ELECTRODE CELLS AND OPERANDO CHARACTERIZATION

- 8 × ECC-Combi (EL-cell)
  - 2 × heat resistance set (up to 150 °C)
- 3-electrode pouch cells
- Optical *operando* cell (EL-cell, ECC-Opto-10)

Pouch cell cutter, cell layers and a ready cell



## ELECTROCHEMICAL CHARACTERIZATION

Cyclers

- 2 × 8 channels 10  $\mu\text{A}$  – 100 mA (BCS-810, Biologic)
- 6 × 8 channels 100  $\mu\text{m}$  – 1 A (BCS-805, Biologic)
- 3 × 8 channels 10 mA (Neware)

Potentiostats

- 8 × channels 10  $\mu\text{A}$  – 1 A, EIS 1 MHz – 10  $\mu\text{Hz}$  (VMP-3e, Biologic)
  - 1 × AUTOLAB PGSTAT128N (10 nA – 1 A) with FRA32M module (Metrohm)
- 1 × Vertex (10 nA – 1 A) (Ivium)

Thermal control

- Environmental chambers (-70...+120 °C, RH 10-90%)

Operando cells and 3-electrode cells



## OTHER CHARACTERIZATION METHODS

- Optical microscopy
- SEM and EDX
- X-ray microCT
- Profilometry
- FTIR spectroscopy
- Raman spectroscopy
- BET/BJH surface area/pore size distribution
- + wide variety of other tools available at VTT (please ask if you need special characterization methods)

Cycler

Environmental chamber

