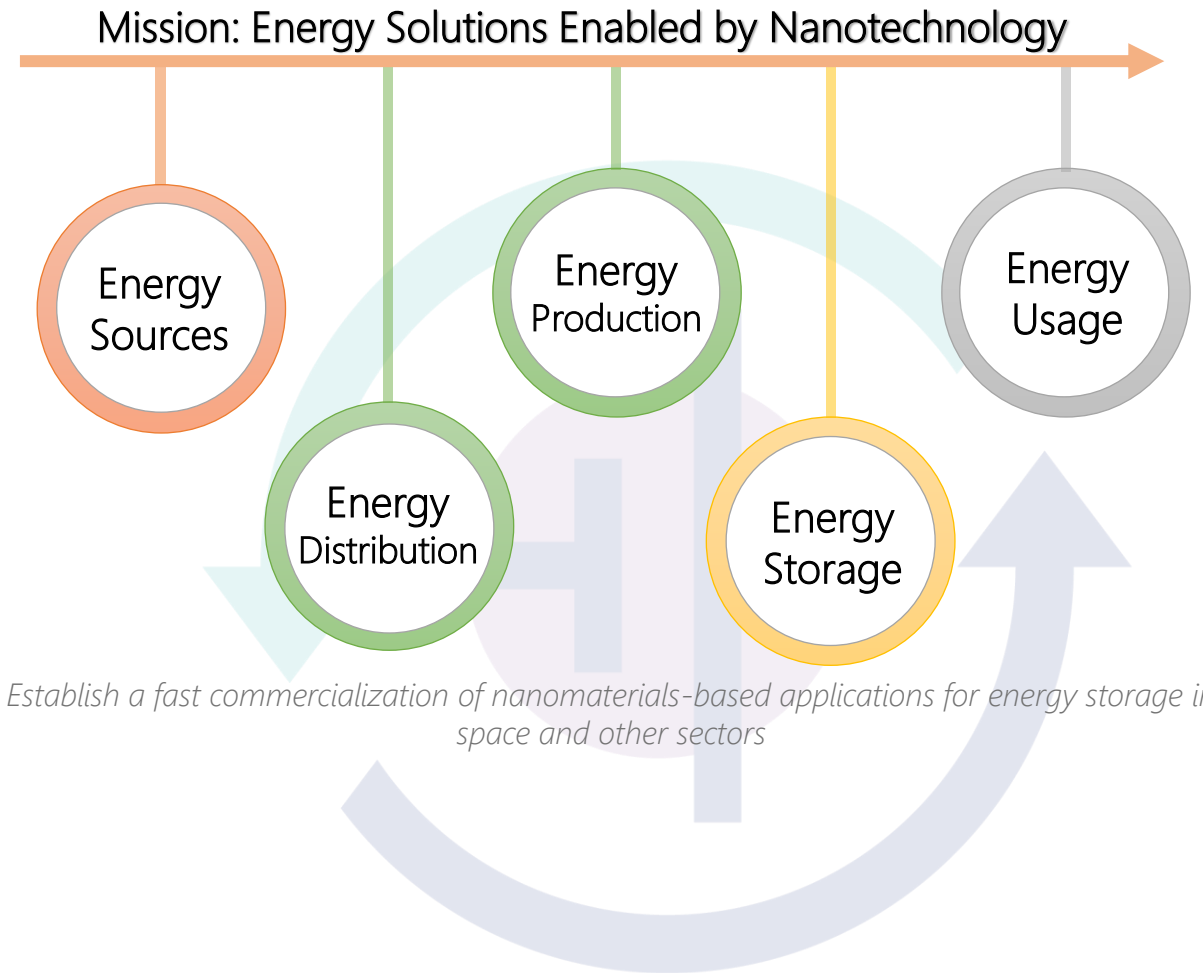


# Pleione Energy Overview

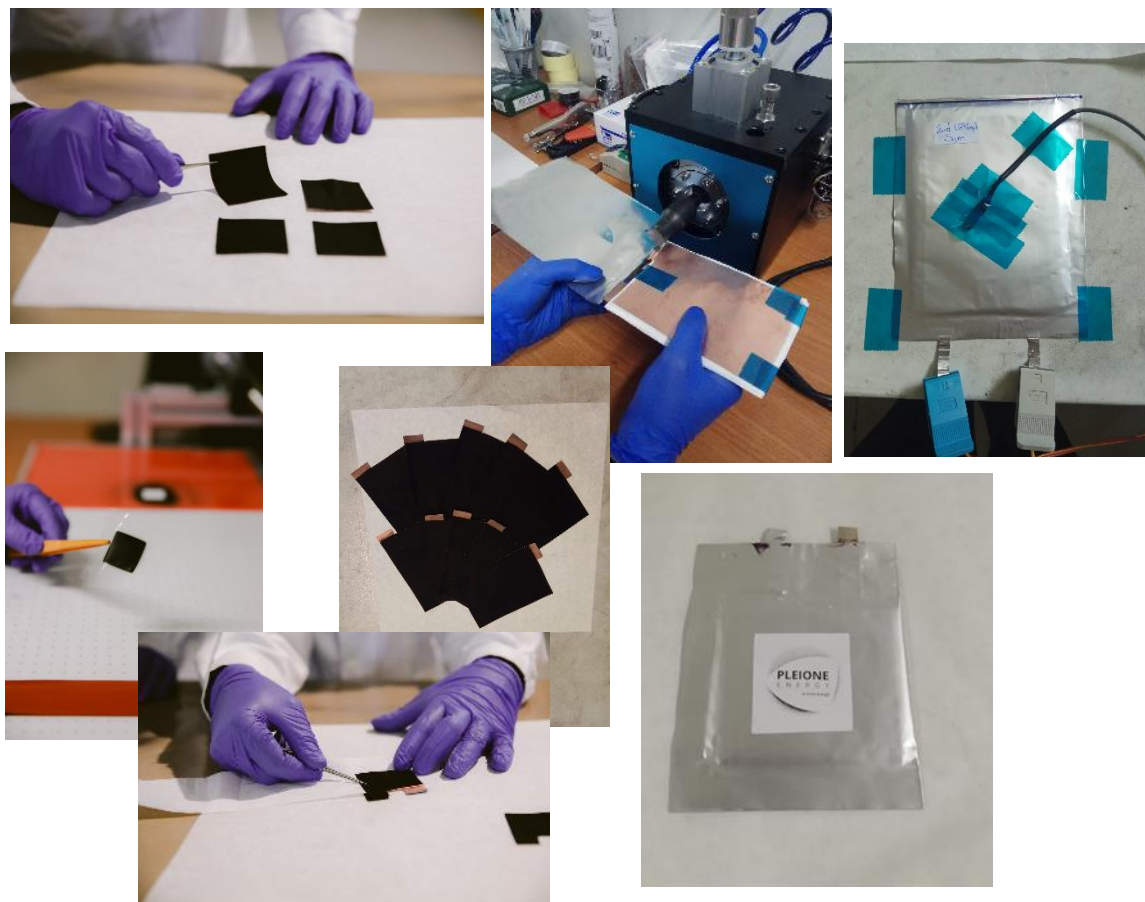


- Established in 2015
- International Joint Venture between a German and Greek company
- Location: NCSR Demokritos, Athens, Greece
- 6-strong team of engineers (50% PhDs & 50% MSc)
- Shareholders:
  - 51% Adamant Composites Ltd
  - 49% Omnidea-RTG GmbH



# Pleione Energy Overview

FROM ELECTRODE FORMATION TO FINISHED ENERGY STORAGE SYSTEMS – WE FIND THE OPTIMAL SOLUTION TO SUPPORT YOU ALONG ALL PRODUCTION STEPS



Pleione Energy has a production solution for all processes that the battery and supercapacitor cells manufacturing require– adapted to your needs.

Due to the efficient production processes for manufacturing battery and supercapacitor electrodes and cells, Pleione Energy achieves increasingly precise as well as sturdy cell structures.

Precision, reliability, durability, and low overall operating costs are the main features of our high-tech production systems.

## Project support / Material Support

We accompany you from the initial idea to the final production process and are at your side during planning and construction of your electrodes and cells.

## Process support

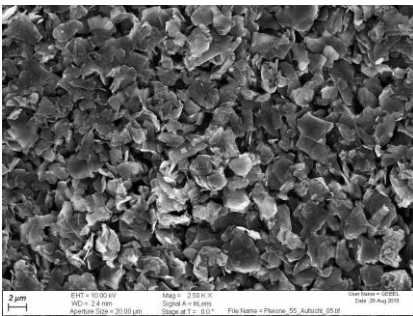
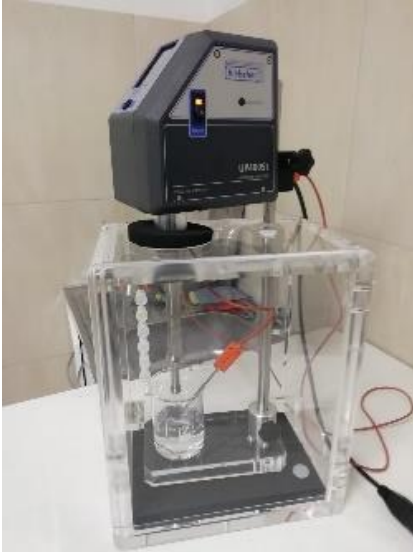
Pleione Energy has vast know-how that we will gladly use to support you in the development or optimization of your own manufacturing process.

\*The pilot line can be adapted uniquely upon request.

# Pleione Energy Pilot Line Facilities



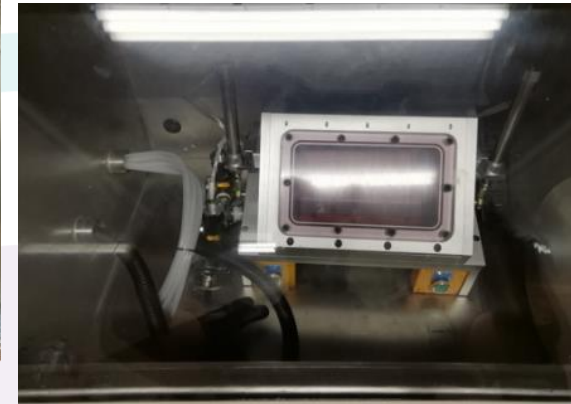
Graphene Processing



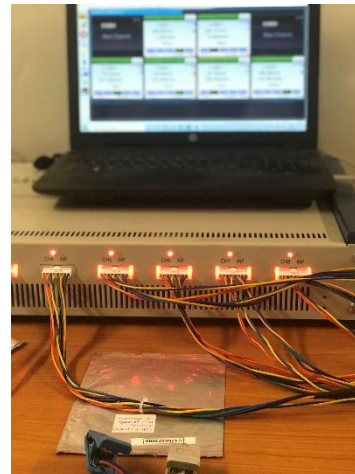
Electrode Processing



Cell & Battery Production



Cell Testing



# Pleione Energy Pilot Line Features

## Electrode Production & Processing Equipment Features

- **Ultrasonic homogenizer** for active material dispersion and electrode slurry preparation (Hielscher, Type: UP400ST with max power 400 w, 24 kHz)
- **Semi-Automatic Active Paste Coating Device** with vacuum table and temperature control
- **Hot Rolling Press Machine** for adjusting thickness and increasing active material density of the electrode in Li-Ion batteries research after coating and drying. It is designed for preparing battery electrode for both inside or outside glove-box. (Xiamen Lith Machine Ltd, Type: LITH-JS300 with variable speed, 100mm to 400mm width, max. working temperature 130°C, high torque 24V DC motor for a safe operation under Ar gas environment)

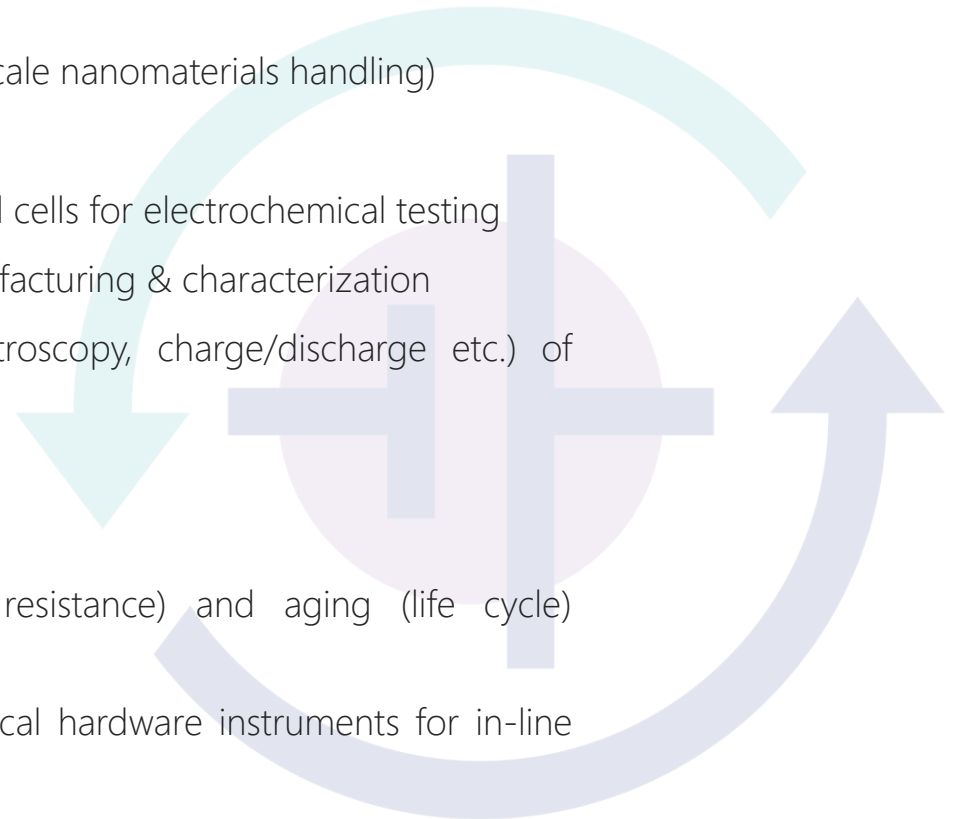
## Cell and Energy Storage Packs Production Equipment Features

- **Glove box** with 2 gloves and HEPA Pack 1 filter (PMMA, ITECO SG20) for nanoparticle powder handling
- **Vacuum oven** with digital temperature control (MTI Corp., Maximum Temp. 200 °C) for thorough drying of the produced electrodes at production stage as well as before cell assembly
- **Inert atm. Glove-box** with Nitrogen Atmosphere (MTI Corp., Compact Stainless-Steel Vacuum Glove Box,) for cell assembly
- **Ultrasonic tab welder** (T-MAX, Frequency 24 KHz, Maximum Power 2 KW, Welding Thickness: 0.15 – 2 mm for Copper, 0.2 – 3 mm for Aluminum and 0.1 – 1.2 mm for Nickel) for welding all metallic interconnections of the cell
- **Pouch cell sealing machine**, to seal the developed pouch cells under vacuum
- **Digital Multimeter** Keysight 34461A, 6½ Digit, Truevolt DMM
- 8-channel MTI Corp **Battery Analyzer** (0-5V, 0-5 A)
- **Potentiostat/Galvanostat** Autolab PGSTAT204 (-10 – 10 V, 10nA to 100 mA) with **Electrochemical Impedance Spectroscopy module** FRA32M (10µHz – 32MHz)

# Pleione Energy Pilot Line Services

Complete pilot line access (fast end-to-end battery and supercapacitor development utilizing nanomaterials - graphene)

- ✓ Electrode formulation development using nanomaterials (small-scale nanomaterials handling)
- ✓ Electrode formation and coating (film applicator)
- ✓ Sample preparation of battery and supercapacitor electrodes and cells for electrochemical testing
- ✓ Battery and supercapacitor half-cell and pouch cell design, manufacturing & characterization
- ✓ Electrochemical testing (cyclic voltammetry, impedance spectroscopy, charge/discharge etc.) of provided electrodes & cells
- ✓ Battery and supercapacitor module assembly
- ✓ Battery and supercapacitor cell activation and testing
- ✓ Performance (capacity, open-circuit voltage, self-discharge, resistance) and aging (life cycle) evaluation of battery and supercapacitor cells
- ✓ Pilot line access and integration of techniques and GHz-electrical hardware instruments for in-line measurements





Antonios Vavouliotis  
Chief Executive Officer

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 NCSR DEMOKRITOS

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