





## ŁUKASIEWICZ RESEARCH NETWORK

**4500** Researchers and Experts

**26** Institutes located in 12 cities all over Poland

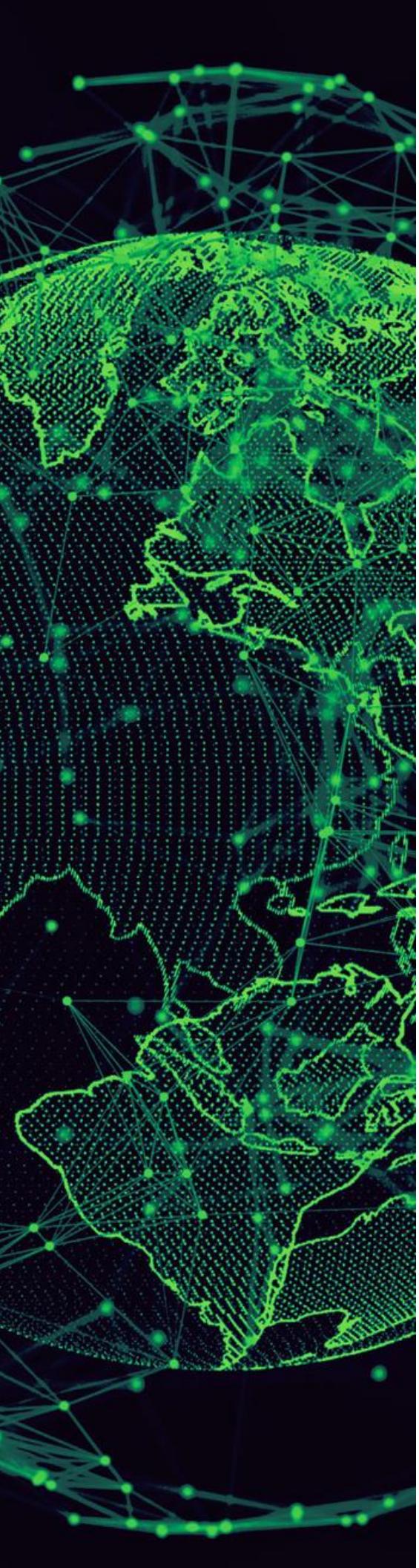
**12000** Performed projects



We operate in line with  
**SCIENCE IS BUSINESS MODE**

### We work within Research Groups:

- Green Economy, Low-Carbon Economy Smart
- Smart Mobility
- Digital Transformation
- Health



## **ŁUKASIEWICZ RESEARCH NETWORK**

### **INSTITUTE OF NON-FERROUS METALS**

- 1952** Establishment of the Institute
- 1954** Establishment of the Division in Skawina
- 1974** Establishment of the Division in Legnica
- 2007** Incorporation of CLAiO and establishment of a Division in Poznań
- 2019** Joining Lukasiewicz Research Network



## Łukasiewicz - IMN

### WHAT DISTINGUISHES US?

- Highly qualified research staff
- Cooperation with the industry
- Modern research equipment
- Application-oriented research and development works, expert opinions
- Pilot installations
- Accredited laboratories
- Lines for small-scale production
- Active participation in the European Research Area

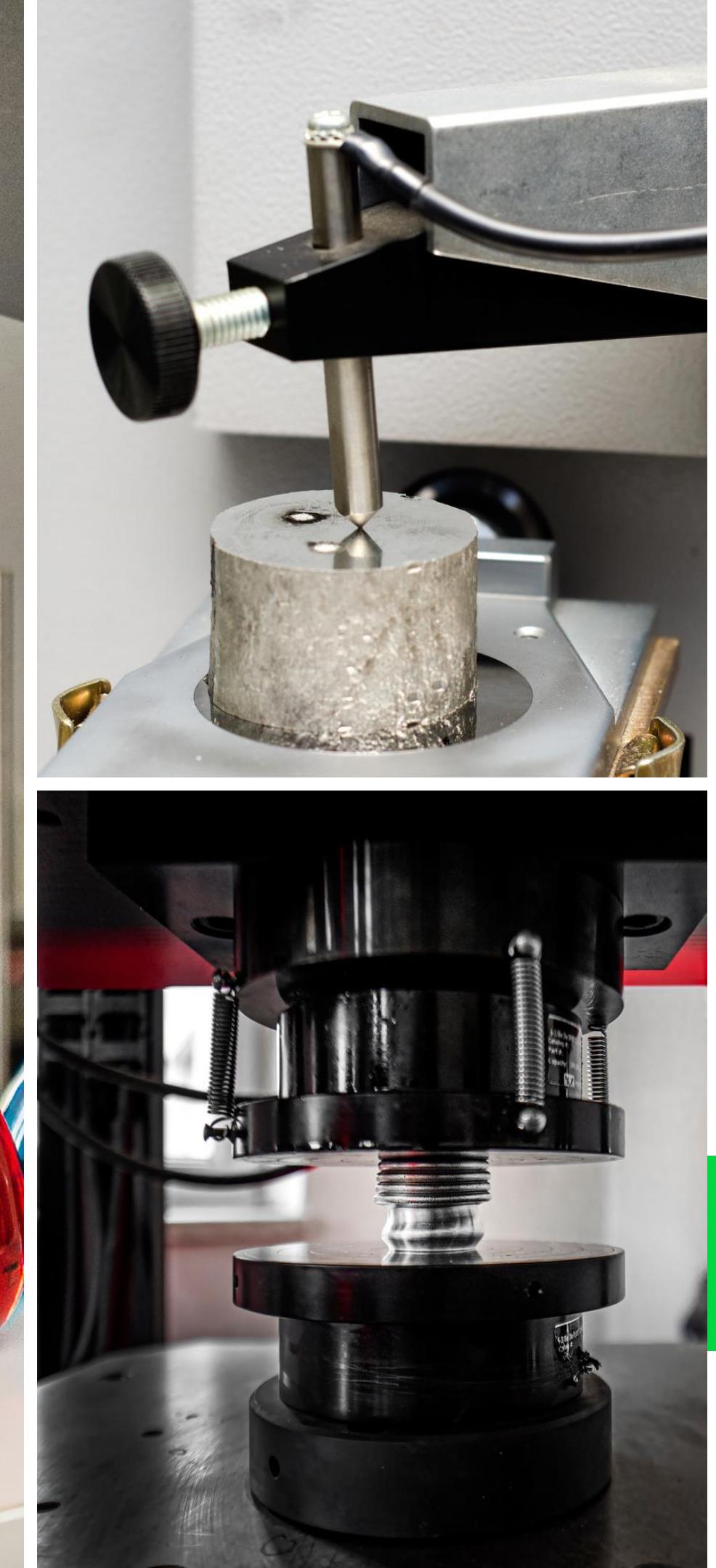
# ŁUKASIEWICZ - IMN INDUSTRIAL PARTNERS

We have about 6500 contractors from 50 countries





# ŁUKASIEWICZ - IMN RESEARCH CENTRES





# CENTRE OF MINERAL PROCESSING



## Director of the Centre

Łukasz Skrzypiec, MSc

phone no. +48 (32) 238 06 38, mobile phone: 607 095 666

e-mail: lukasz.skrzypiec@imn.lukasiewicz.gov.pl

## Areas of activity:

- R&D works in the field of development and selection of technologies for the enrichment of non-ferrous metal ores, coals, waste, and secondary materials
- evaluation and optimization of processing operations in order to improve their efficiency
- development of new and modernization of the existing processing equipment, including flotation machines, and classification and thickening hydrocyclones
- analysis of different types of raw materials in a wide grain size range
- research on the selection of reagents for the flotation of various types of mineral resources and waste materials
- analysis of the potential for the application of mechanical treatment methods in Urban Mining and Circular Economy
- expert opinions in the field of processing mineral resources, waste and secondary materials
- laboratory and semi-technical analyses of screening, crushing, grinding, gravity



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# CENTRE OF PYROMETALLURGY



## Director of the Centre

Grzegorz Krawiec, MSc

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### Areas of activity:

- development of methods for the preparation of the charge for metallurgical processes by briquetting (with a selection of optimal types of binders), palletizing, sintering and roasting
- development of process-based design, as well as technical and technological analyses of the existing and new processes together with guidelines for their design
- development of technologies for recovery of non-ferrus metals from concentrates and from all sorts of secondary materials (technological concept, selection of equipment and conditions, basic engineering)
- development of methods for refining of non-ferrous metals from impurities
- development of methods for obtaining chemical compounds and usable alloys from semi-finished products and wastes containing non-ferrous metals
- mathematical modeling and development of algorithms for the control of metallurgical processes and decision support systems
- expert opinions and analyses of existing technologies for rationalization of energy consumption, development of the optimum method for waste heat recovery, and limitation of the negative impact of a plant on the environment



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# CENTRE OF HYDROELECTROMETALLURGY



## Director of the Centre

**Katarzyna Leszczyńska-Sejda, PhD**

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## Areas of activity:

- development of hydrometallurgical technologies for the copper industry
- recovery of strategic metals from waste in the form of high-purity compounds
- development of hydrometallurgical technologies within the performed EU-funded projects
- development of technologies enabling the increase of secondary materials content
- solvent extraction and ion exchange application in non-ferrous metals hydrometallurgy
- investigations and basic research in the field of non-ferrous metals hydrometallurgy and electrochemistry, including chemical engineering
- technical consulting and expert opinions in the field of hydrometallurgy





# CENTRE OF ENVIRONMENTAL PROTECTION



**Director of the Centre**

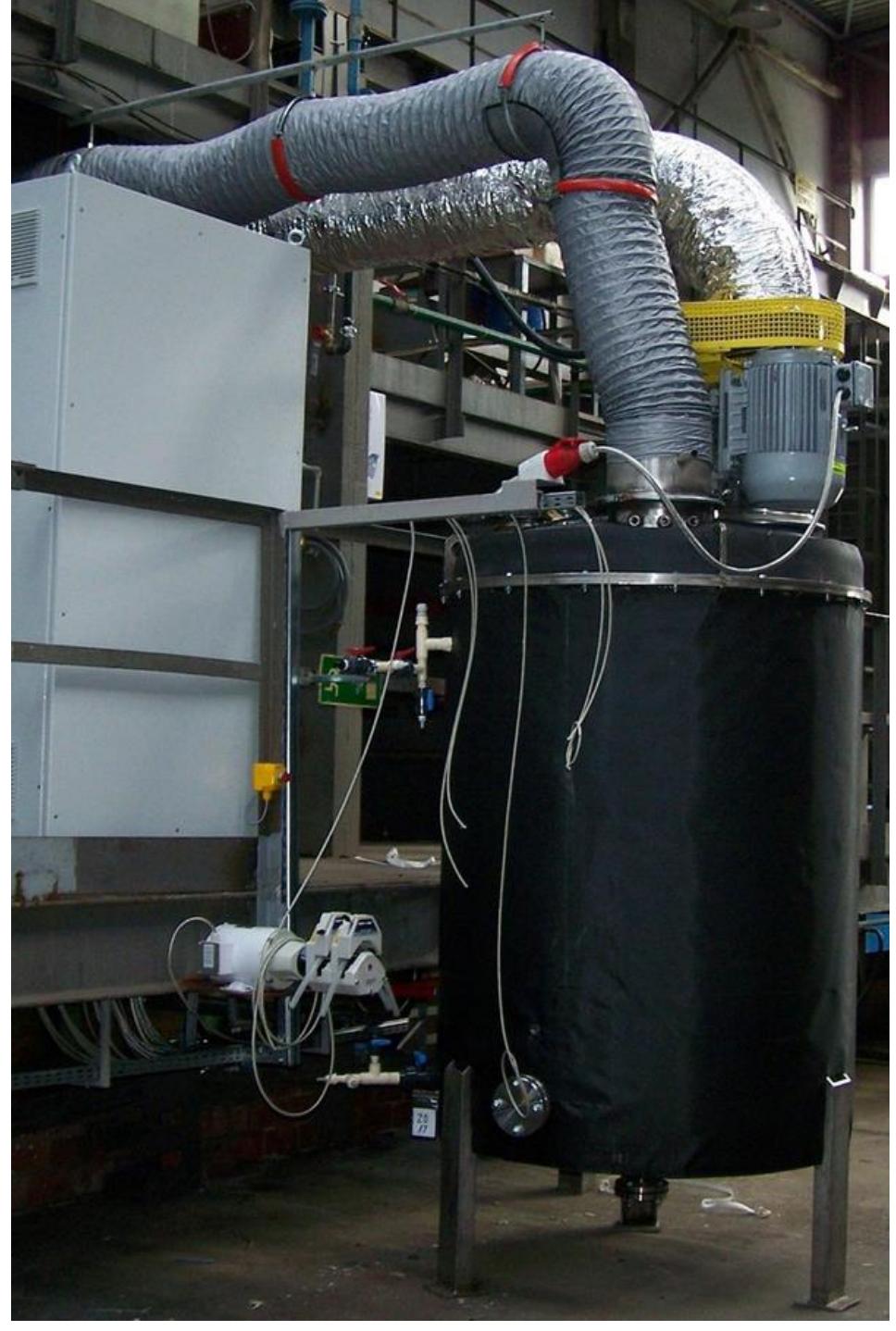
**Jan Mrozowski, PhD**

phone no. +48 (32) 238 06 29

e-mail: [jan.mrozowski@imn.lukasiewicz.gov.pl](mailto:jan.mrozowski@imn.lukasiewicz.gov.pl)

## Areas of activity:

- modern solutions in the field of Circular Economy
- recovery of metals from solid and liquid waste
- membrane technologies for desalination processes
- innovative methods of waste gases purification
- environmental and quality analyses of wastewater
- emission and control measurements of process and waste gases
- modernization of existing dedusting installations and wastewater treatment plants
- preparation of documentation necessary to obtain integrated and relevant permits



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# CENTRE OF ANALYTICAL CHEMISTRY



## Director of the Centre

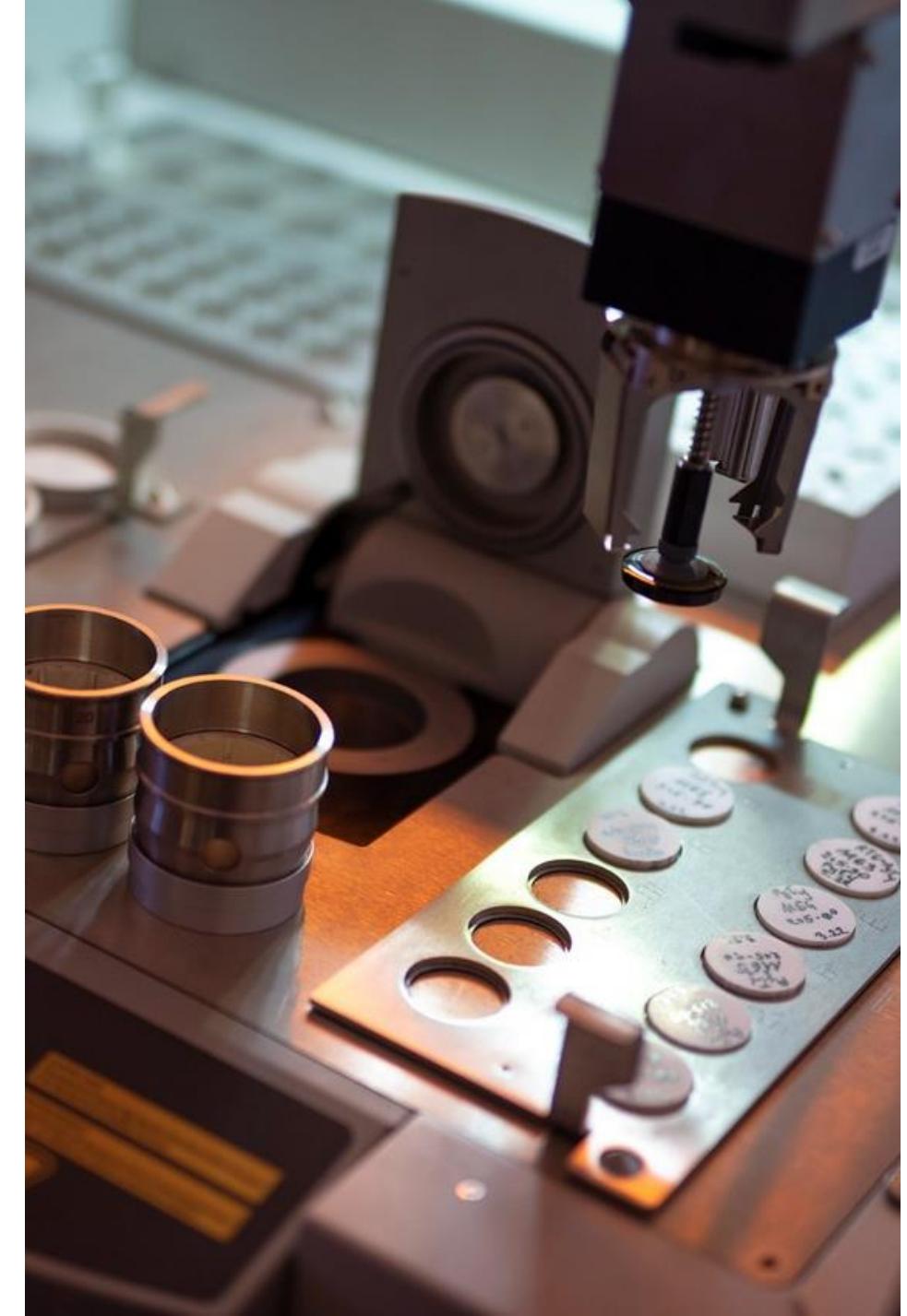
**Tadeusz Gorewoda, PhD**

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e-mail: [tadeusz.gorewoda@imn.lukasiewicz.gov.pl](mailto:tadeusz.gorewoda@imn.lukasiewicz.gov.pl)

## Areas of activity:

- development of analytical methods
- participation in R&D projects
- analytical services and expert opinions
- training in the field of instrumental and classical analyses
- inter-laboratory examinations
- production of calibration materials, reference materials and CRM meeting individual customer needs
- accreditation of the producer of reference materials, for compliance with the standard PN-EN ISO 17034
- Quality System in conformance with the standard PN-EN ISO/IEC 17025



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# CENTRE OF ADVANCED MATERIALS TECHNOLOGIES



## Director of the Centre

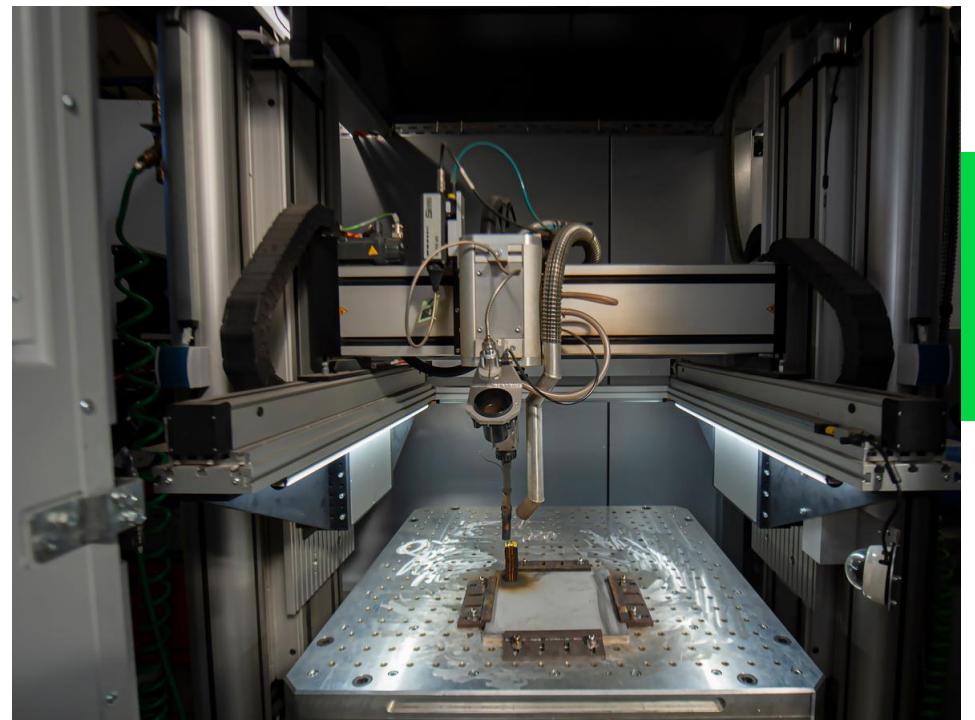
**Joanna Kulasa, PhD**

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e-mail: joanna.kulasa@imn.lukasiewicz.gov.pl

## Areas of activity:

- complex activity in the field of development of new materials and products, as well as studies, including melting and refining technologies, casting and plastic working processes, 3D printing – WAAM technology, HIP – hot isostatic pressing, and manufacturing of composites by liquid-phase technologies
- development of 3D printing – WAAM technology
- material expert opinions on the non-ferrous metal products
- small-scale production of cast and extruded products from non-ferrous metals and their alloys, drawn products and bimetallic wires



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# CENTRE OF FUNCTIONAL MATERIALS



## Director of the Centre

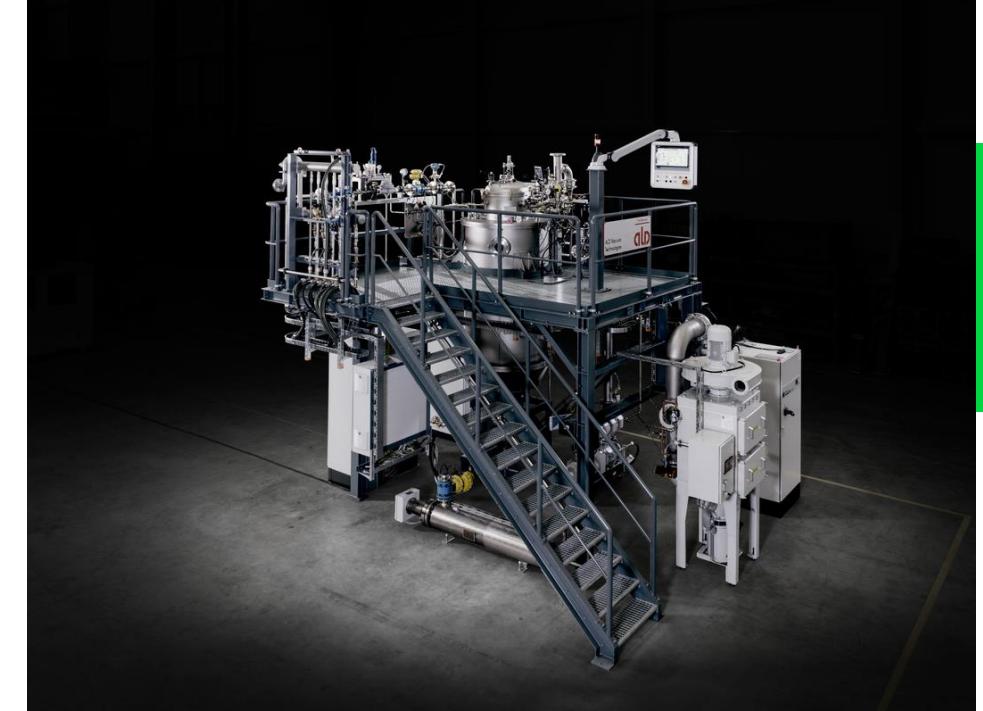
Aleksandra Kolano-Burian, PhD

phone no. +48 (32) 238 02 51

e-mail: aleksandra.kolano-burian@imn.lukasiewicz.gov.pl

## Areas of activity:

- technology for the production of nanocomposites in a form of wound or stacked cores
- stators for electric motors and ventricular assist pumps supporting heart function
- production of contact rivets
- production of amorphous binders
- gas atomization
- technology for the production of printed magnetic components
- new materials and technologies for power electronics, energy, transport and medicine





# CENTRE OF POWDER AND COMPOSITE MATERIALS



## Director of the Centre

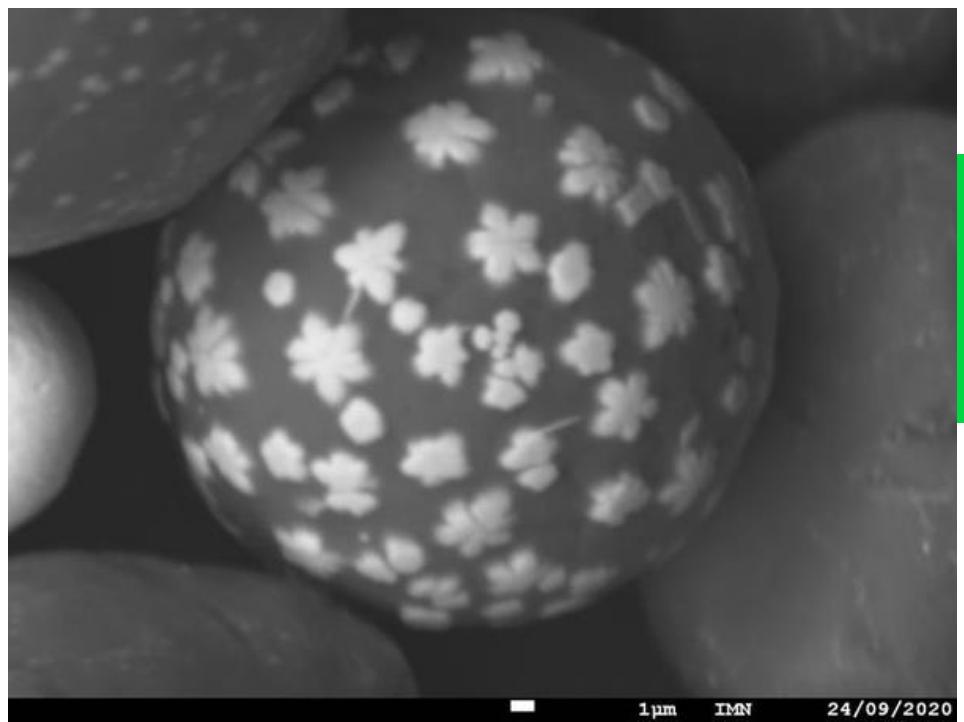
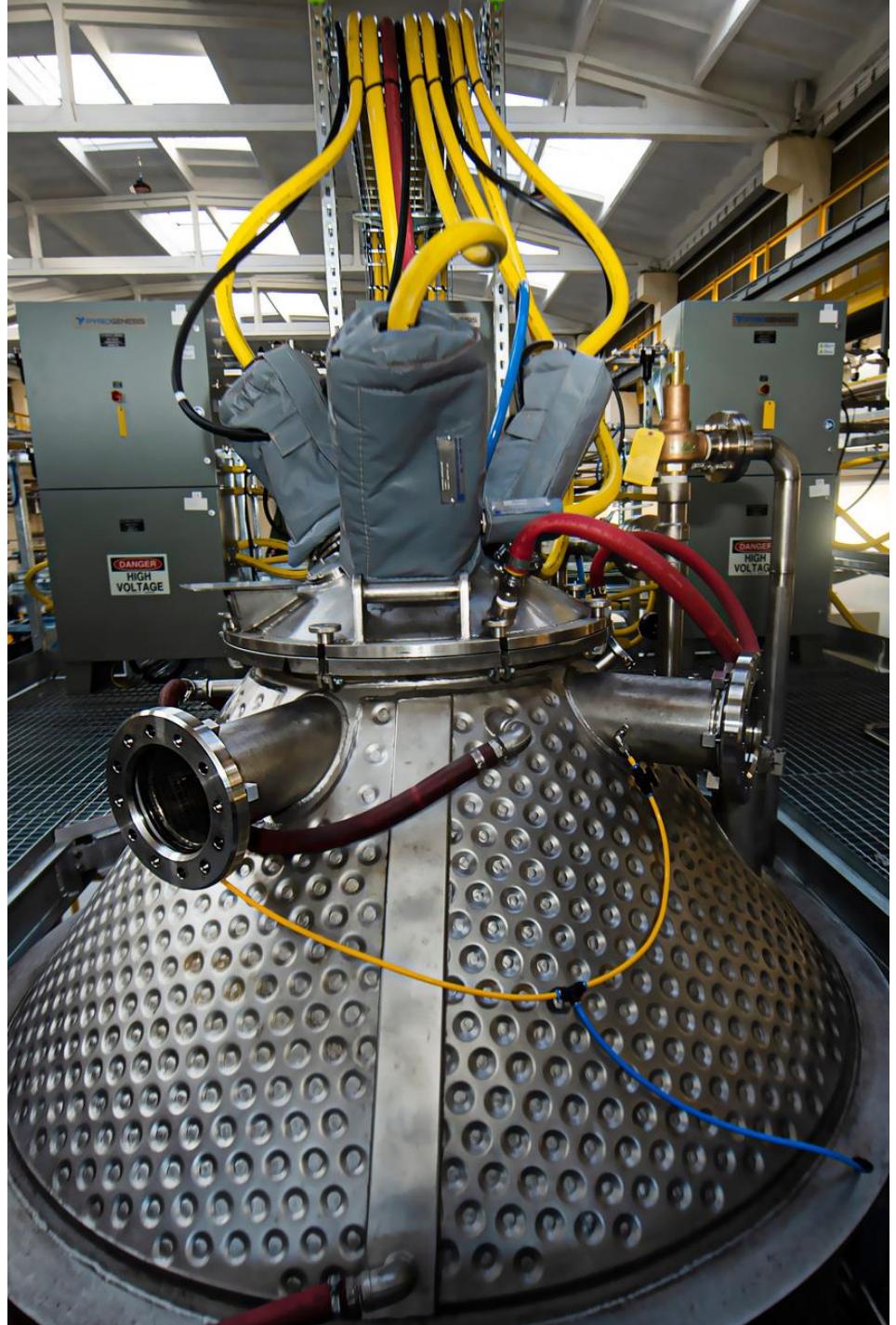
**Adriana Wrona, PhD**

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e-mail: [adriana.wrona@imn.lukasiewicz.gov.pl](mailto:adriana.wrona@imn.lukasiewicz.gov.pl)

## Areas of activity:

- production of powders by plasma spraying
- development of functional coatings produced by plasma spraying
- production of metallic and composite micro-, and nanopowders by chemical methods, mechanical synthesis, and grinding
- recycling of materials using plasma and chemical technologies
- production of biologically active materials with antimicrobial properties using copper-based composites
- production of powders for additive manufacturing (AM) processes





# ŁUKASIEWICZ - IMN DIVISION IN POZNAŃ



## Director of the Division

Grzegorz Lota, PhD, Prof

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e-mail: [claio@claio.poznan.pl](mailto:claio@claio.poznan.pl)

## Areas of activity:

- development of solutions in the field of stationary energy storage systems as buffer power supplies integrated with renewable energy sources for civil and military applications
- BTR series thermal batteries, aircraft and special purposes batteries
- research works in the field of materials of chemical power sources, and batteries recycling
- implementation and market expertise
- certification of the mobile power sources
- research on the new types of chemical power sources



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# ŁUKASIEWICZ – IMN DIVISION IN SKAWINA



## Director of the Division

Andrzej Kłyszewski, PhD

phone no. +48 (12) 277 88 10

e-mail: [oml@imn.lukasiewicz.gov.pl](mailto:oml@imn.lukasiewicz.gov.pl)

## Areas of activity:

- development of technology for the preparation of the liquid metal for casting
- casting of aluminium, aluminium alloys, and magnesium alloys in a form of ingots and bars for plastic working
- processes of plastic working of light metals, including extrusion, rolling, forging, drawing, and stamping
- manufacturing of protective coatings on Al and Mg-based products
- production of new advanced materials based on light metals
- corrosion tests



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# ŁUKASIEWICZ - IMN DIVISION IN LEGNICA



**Director of the Division**

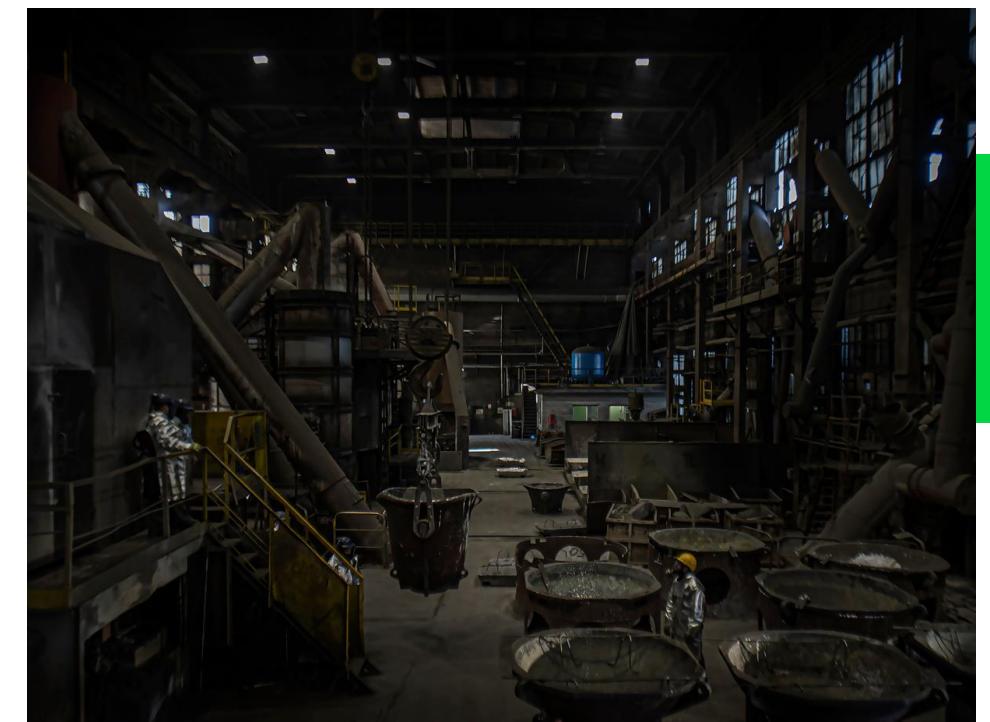
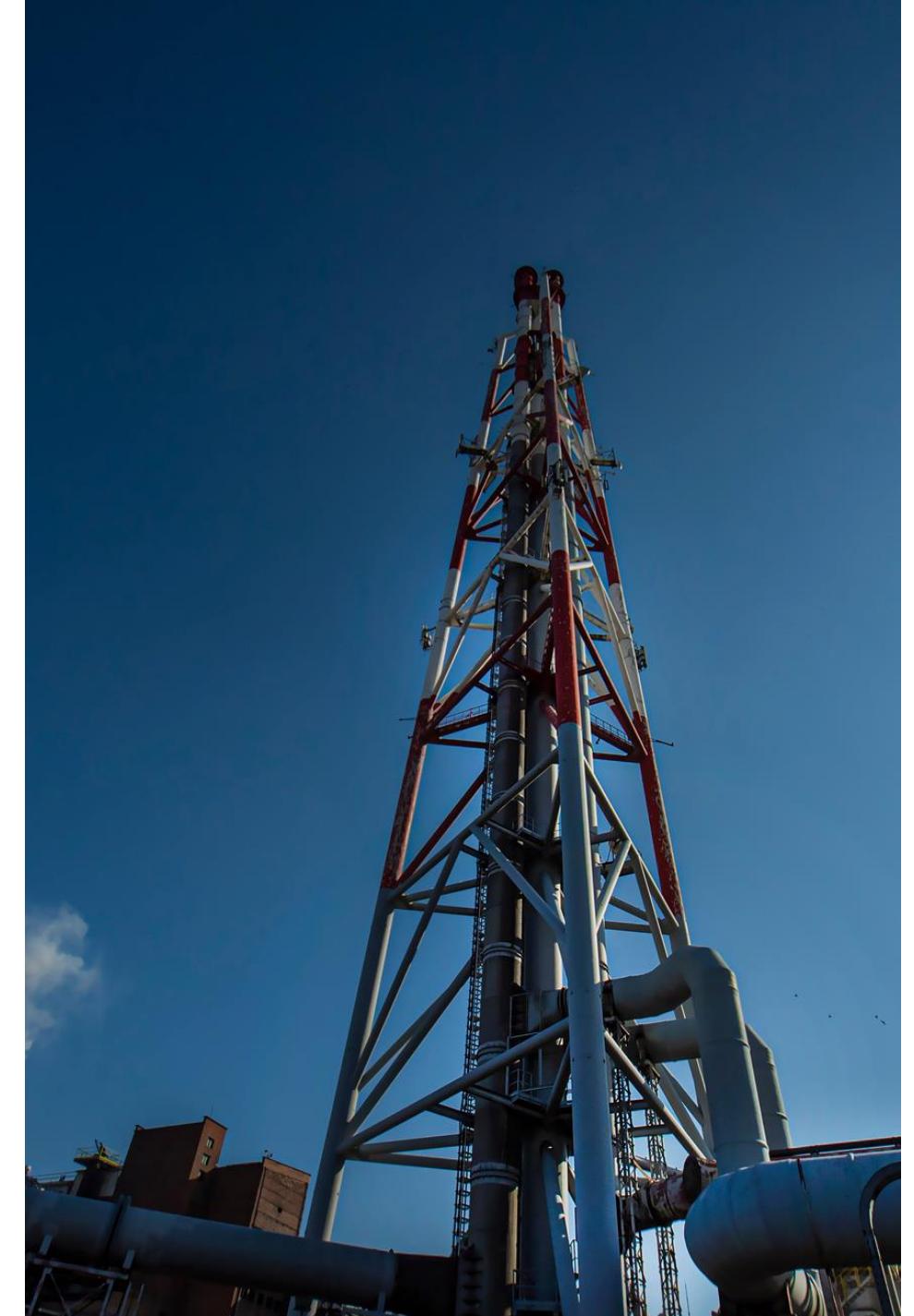
**Arkadiusz Szpakowski, MA**

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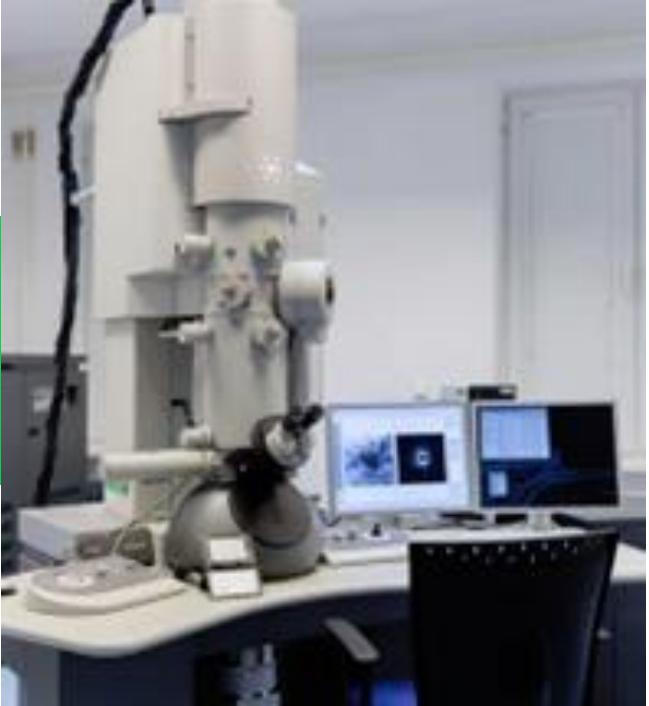
## **Areas of activity:**

- professional waste management
- production based on waste materials
- proprietary recovery technologies
- experimental production installations
- R&D and implementation works supported by the experience of the main R&D centre of the Polish non-ferrous metals industry
- production of the abrasive used for high-pressure cleaning - Polgrit abrasive



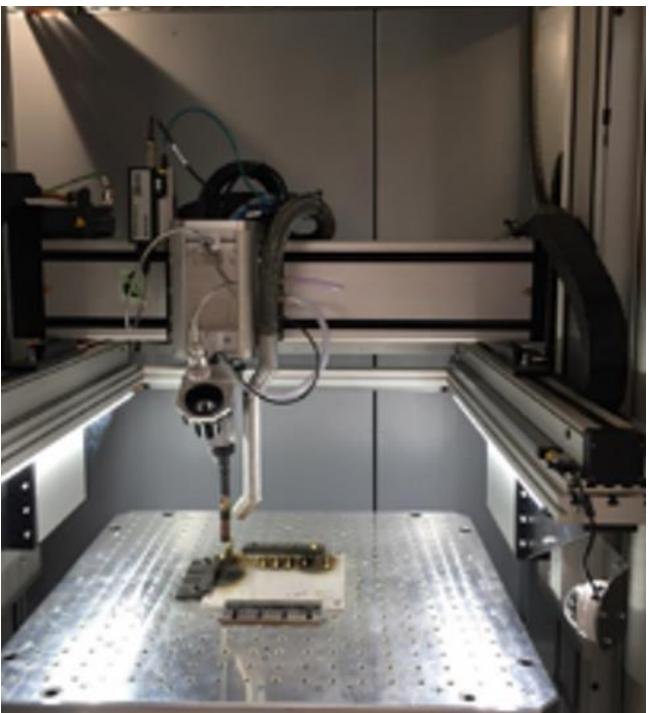
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# PRODUCTION POSSIBILITIES

## Produkcja w Łukasiewicz - IMN



- Possibility of production from a few kilograms to several tons
- Small series production
- Flexibility in modification of the material properties
- Short delivery time
- Possibility of products and technologies upgrading
- Testing the solutions on a laboratory/semi-industrial scale



## AREAS OF COOPERATION

- Castings of non-ferrous metals
- Non-ferrous metal products after plastic working
- Decorative-protective and hard anti-abrasive coatings on Al and Mg-based alloys
- Rapid prototyping based on 3D printing techniques
- Additional light armour
- Technologies for the production of sheets and strips made of non-ferrous metals intended for stamping
- Sliding materials
- Non-ferrous metal materials intended for potentially explosive environments
- Non-ferrous metal alloys with improved properties designed for operating in difficult conditions

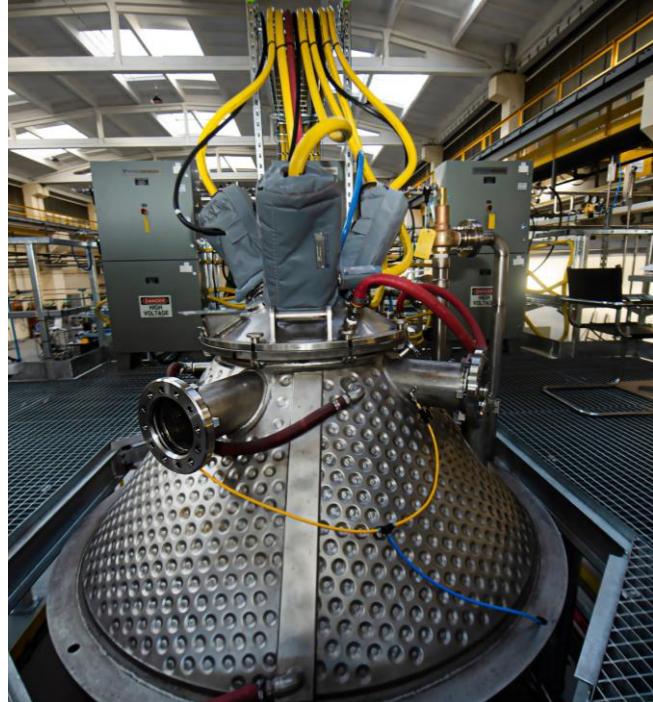


## AREAS OF COOPERATION

- Heavy metal-based materials
- Metallic or composite protective coatings increasing the resistance of metallic surfaces
- Thermal batteries as a power supply for guidance, steering, and standby mode systems of intelligent ammunition (rockets, guided missiles, bombs, torpedos, etc.)
- Ampoule batteries to power the intelligent ammunition (mainly programmable and specialized missiles)
- Development and production of Li-ion, Ni-MH, and Lithium – thionyl chloride cell packages

# PILOT INSTALLATIONS

- Installation for examination of gas desulphurization processes
- Installation for examination of membrane processes
- Refrigerating cycle installation with a fan cooler
- Laboratory pilot installation for the enrichment of mineral resources (LPI) – simulation of the industrial flotation processes
- Pilot-scale installations of Waelz kiln, rotary-rocking furnace, arc-resistance furnaces, and plasma arc furnace
- Pilot line for production of rapidly quenched materials
- Pilot line for production of the amorphous and nanocrystalline block, cut and stacked cores
- Pilot line for production of contact rivets
- Installation for conducting studies into leaching processes
- Installation for continuous liquid extraction processes
- Installation for investigations into electrorefining and electrowinning of metals
- Apparatus for conducting leaching processes
- Apparatus for conducting leaching processes at elevated pressure and temperature
- Pilot line for the semi-continuous casting of ingots, and extrusion of profiles from Al and Mg-based alloys



# THANK YOU!

## Contact



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