

# **Technology Transfer of Novel Magnetic Micro/Nanomaterials: Comprehensive and Value-Added Approaches**

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**NIRDTP Iași**

## Comprehensive Technology Transfer

### Specific infrastructures

- preparation (*clean room*)
- structural characterization
- thermal stability
- electrical and magnetic characterization  
(*electromagnetic shielding room*)

### Novel magnetic micro/nanomaterials

### Value-Added Technology Transfer

- Automotive industry (sensors)
- Aeronautics (actuators and transducers)
- Medical industry (cancer diagnosis and treatment, MRI, drug delivery, micro- and nanofluidics)
- IT (magnetic logic, spintronics, novel data storage media)
- Energy (energy harvesting, magnetic refrigeration, nanomagnets)
- Climate monitoring (sensing)



# Competences at NIRDTP Iași

NIRDTP Iași develops fundamental and applied research activities, mainly in the field of magnetism, magnetic materials and their applications.

The main S&T research activities are focusing on:

- (i) *fundamental research*: new models and phenomena, new theoretical aspects;
- (ii) *applied research*: new materials and applications, new R&D equipments;
- (iii) *technological research*: novel technologies for manufacturing new materials, including nanomaterials, nanostructured and nanocomposite materials; design and fabrication of new devices and equipments;
- (iv) *laboratory-scale production*: materials, devices, systems and equipments for both laboratory research and small-scale production activities.



# S&T research directions implemented at NIRDTP İaşı

## Synthesis of new materials (1D, 2D, 3D) by innovative techniques:

- rapidly solidified melt-spun ribbons, microwires, glass-covered micro- and nanowires, bulk metallic glasses;
- electrodeposited thin films and nanowires;
- micro- and nanopowders;
- functionalized nanocomposites and mesoporous materials;
- multilayered thin films prepared by sputtering, e-beam evaporation or laser ablation.

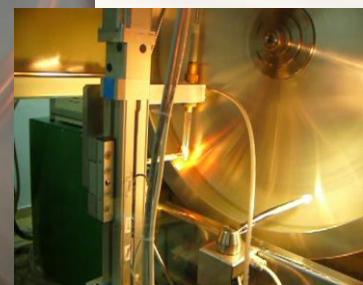
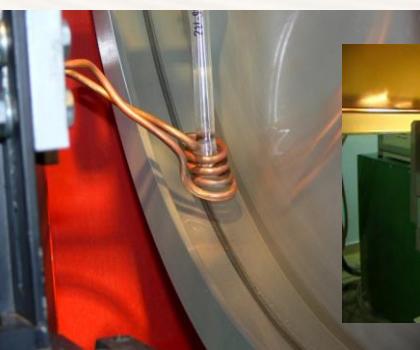


# S&T research directions implemented at NIRDTP İaşı

## New applications based on the materials prepared at NIRDTP:

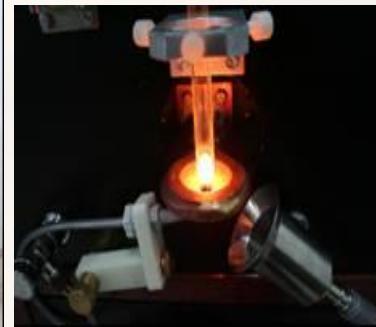
- design and fabrication of new **materials for energy transportation and power electronics** (power transformers, DC-DC converters, AC-DC converters);
- design and fabrication of new **sensors for engineering, medical and biomedical applications**;
- the use of special magnetic materials and magneto-transport phenomena to design and produce **new magnetic sensors** (magnetic field sensors; vibrating, position and displacement sensors; torque and stress sensors; electronic surveillance labels/tags; safety systems; fluxgate sensors or hybrid combined systems)
- development of **new sensors and actuators based on magnetoelastic processes**;
- design and fabrication of **non-destructive control sensors**;
- **new systems and devices** based on magnetic materials, **for defense and security purposes**.





Transferred

Samples  
Preparation



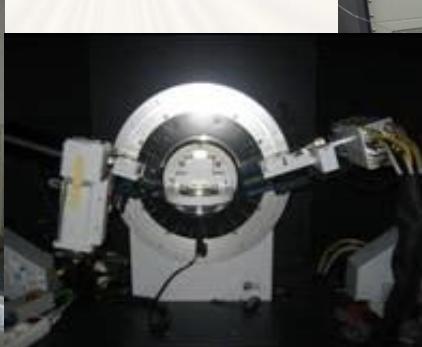


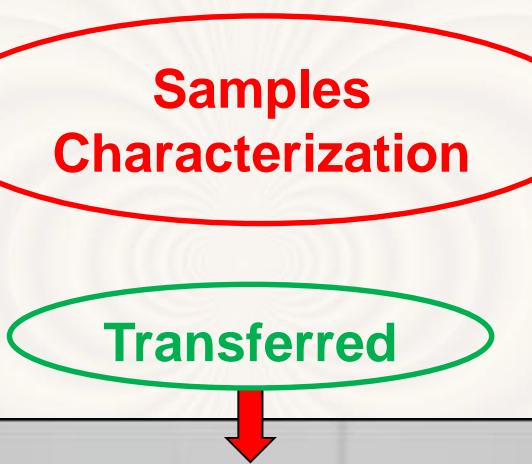
Samples  
Preparation





Samples  
Characterization

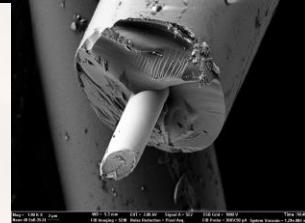




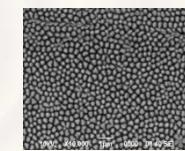
TP İaş

# Success Stories

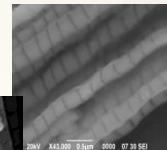
**Tehnologies for the preparation of amorphous and nanostructured magnetic materials:** melt-spun ribbons (**consultancy and commercialization**), conventional microwires (**consultancy and commercialization; technology transfer to a company from USA**), glass-coated micro and nanowires (**4 international patents – 1 USA, 1 CA, 2 EU; consultancy and commercialization**), nanowires and micro/nanopowders for sensors development (**consultancy and commercialization**).



Equipment for melt-spun ribbons preparation



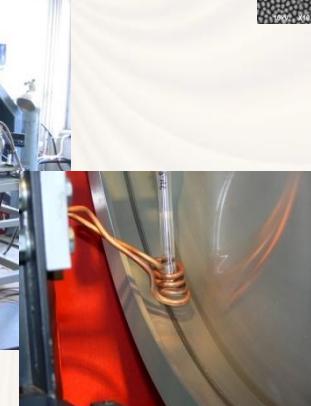
Magnetic nanowires



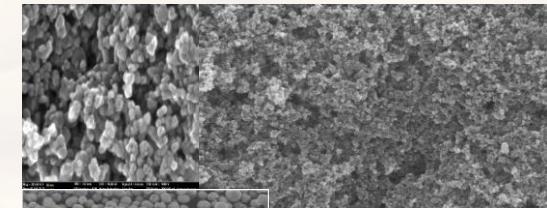
Multilayered magnetic nanowires



Equipment for conventional microwires preparation.



Equipment for the preparation of glass-coated micro and nanowires.



Magnetic nanopowders





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