



# POLISH ACADEMY OF SCIENCES

## Aleksander Krupkowski Institute of Metallurgy and Materials Science in Cracow



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*Director: Professor Boguslaw Major PhD., DSc*

The Institute was established in 1953 on the initiative of Professor Aleksander Krupkowski – the father of the Polish metallurgy of non-ferrous metals.

It has conducted for many years numerous basic research on the design and production of metallic and non-metallic materials of desired mechanical, physical and chemical properties. In recognition of its scientific achievements, the Ministry of Science and High Education, the main Polish scientific authority, awards the Institute the highest possible grade in every-four-year assessments.

### RESEARCH PRIORITY

#### • User-friendly materials and technologies

- Lead-free solders
- Multicrystalline silicon solar cells
- Biocompatible coating in blood contacting materials

#### • Knowledge-based multifunctional materials

- Gradient materials produced using different methods
- Light alloys of new generation with improved mechanical properties
- Production and optimization of intermetallics properties
- Bulk metallic glasses

#### • Nano- and microcrystalline materials

- Mechanical alloying and hot-pressing of intermetallics
- Severe plastic deformation and fabrication of ultra-fine grain materials

#### • Development of modern research tools and diagnostic methods

- Crystallographic orientation mapping in respect to diagnosis and prognosis of mechanical properties of metallic, ceramic and composite materials basing on the scanning and transmission electron microscopy examinations of local grain orientations
- Data processing of local crystallographic orientations; orientation distribution function, orientation topography, quantitative description of microstructure
- Complex characteristics of advanced materials using, new techniques of transmission electron microscopy.

### EQUIPMENT



*Instron Model 3382  
testing of mechanical properties  
(tensile and compression) at 100kN load*



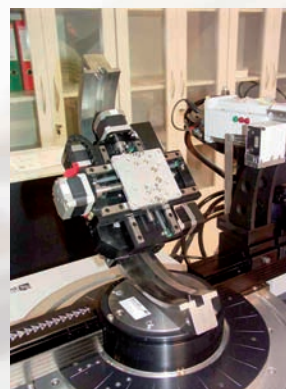
*TEM (Philips CM20 200kV Twin  
with EDS system from EDAX,  
Tecnai G2 F20 200kV with FEG and  
EDS system from EDAX)  
microstructure (bright and dark  
fields, electron diffraction)  
microchemical analysis*



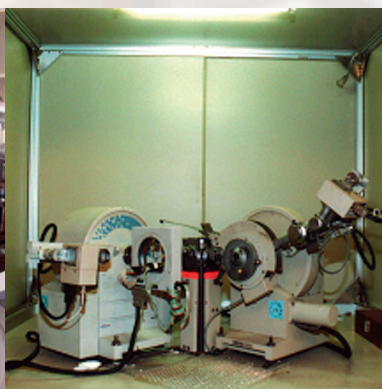
*Scanning Electron  
Microscope  
1. Philips XL 30  
with Link Isis EDS system  
from Oxford Instr.  
2. FEI E-SEM XL-30  
with EDS System from  
EDAX GEMINI 4000)  
microstructure  
microanalysis  
electron backscattered  
diffraction (EBSD)*



*Thermal Analysis  
Instruments  
DSC Q1000 TA;  
SDT Q600 TA;  
DTA DuPont 1600  
scanning differential  
calorimetry*



*XRD (Bruker D-8 Discover and Philips X'Pert PW 1830 + PW 1710)  
phase analysis (splitting and fitting); texture (pole figures, orientation distribution  
function ODF) residual stress*



*Jobin Yvon Glow Discharge Spectrometer JY 10 000 RF  
surface and depth profile analysis*

*Scanning Acoustic Microscope SAM TEC EVOLUTION Series  
nondestructive and fast examinations of volume and layer-thickness materials*

*The Institute Testing Laboratory is in conformance with the norm PN-EN ISO/IEC 17025:2005 and is authorized to perform certified material examinations.  
Staff: 90 persons, including 48 scientific workers, 18 professors and associate professors, 25 assistant professors, 5 research assistants and 16 PhD students.  
The Institute provides in co-operation with the Jagiellonian University: the Faculty of Physics, Astronomy and Applied Computer Science and Faculty of Chemistry, the PhD Study and has right to award the PhD and DSc in materials engineering and metallurgy.*