



Hungary-Romania Cross-Border Co-operation Programme 2007-2013

European Union
European Regional Development Fund



Two countries, one goal, joint success!

Hungarian-Romanian Research Platform for Smart Materials Research Projects Support

**HU-RO SMARTMAT
HURO/1101/191/2-2-1**

Lead partner: University of Debrecen
Project partner: University of Oradea

Platform description

Smart materials have one or more properties that can be modified using specific methods and techniques.

The project aims to develop a joint Hungarian – Romanian research platform in the field of smart and other new materials which will support the development of fundamental research projects.

The platform integrates 3 laboratories, 2 at the University of Debrecen with the purpose of investigating smart and composite materials at macro and micro levels and 1 laboratory at the University of Oradea where nano-scale properties can be analyzed.

Integrating the knowledge of the project partners, the main objective of the project is to create a bilateral platform in the field of new materials, by building a structural base which supports the development of new joint research projects.

The joint team will define the organizational structure and research and educational strategies of the platform, renovate the laboratories, acquire the necessary equipments and integrate in the platform organizational structure. The platform will

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strengthen the cohesion in the field of research and education and will provide a valuable support for companies in the cross-border area. The 3 laboratories are complementary to each other covering analysis capabilities from macro to nano scale. A complex research can be fully realized only by utilizing all laboratories, integrated in a jointly organized research platform.

The key point of the program consists in changes of information, knowledge and ideas between the communities of the border area. Not only that the research is done in close cooperation but the results are used by the communities in both parts of the border area and in the same time addresses major problems stated in the EU research development strategies.

Beneficiaries of the project

A first group of direct beneficiaries of the project are the researchers from the partner universities and from the cross-border region in the field of smart materials, composite materials and material science in general.

A second group of direct beneficiaries are students (BSc., MSc., PhD.) which will benefit from the project's result working with state of the art equipments for new materials analysis accumulating knowledge during their training period. Another important group of direct beneficiaries are researchers and students from other universities, research centers or innovative enterprises which will participate in future joint research projects of University of Oradea and University of Debrecen as partners

and also staff of institutions and companies which will have contract based training courses in the SMARTMAT research platform. Based on the capacity of the laboratories and the estimates made by the project team, the direct beneficiaries group of the research platform

Main equipments available

500 kN ELECTROMECHANICAL TESTER



Capacity: 500 kn.
Max. Distance between two platen (mm): 2.000
Relative error of reading + 1 of applied load and between 2 and 100% of nominal.
Face measuring position: 0,1% class 1.
Speed accuracy: + 1%
Crosshead displacement: automatic PC controlled
Max. Working speed: 0 – 100 mm/min

30 TN HYDRAULIC FLEXURAL TESTING FRAME



Capacity: 30 TN
Hydraulic cylinder: double effect

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Piston travelling distance: 350mm
Face measuring position: 0,1% class 1.
Speed accuracy: + 1%
Piston displacement: automatic PC controlled
Horizontal span: 6 m
Testing width: 70 centimeters

RAPIDAIR 457



RapidAir 457 is an automated image analysis system performing analysis of the air void distribution of hardened concrete according to the ASTM C 457: "Standard method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete"

TableTOP SEM + EDX



Its simplicity enables all users, even those Scanning Electron Microscopy (SEM), to image their samples and to obtain high quality, high resolution images within minutes. No
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NANOINDENTER G200



The Nano Indenter G200 is the most accurate, flexible, user-friendly instrument for nanomechanical testing. Applications include semiconductor, thin films, and MEMs (wafer applications); hard coatings and DLC films; composite materials, fibers, and polymers; metals and ceramics; and biomaterials and biology.

Contact

**University of Debrecen
Faculty of Engineering**

Ótometó str.. 2-4. 4028, Debrecen, Hungary
Tel: +36 (52) 415-155, <http://eng.unideb.hu/info@eng.unideb.hu>

**University of Oradea
Faculty of Managerial and Technological
Engineering**

Universităţii, str. 1, Oradea, România
Tel: +40 259 408 136, <http://imt.uoradea.ro>
imt@uoradea.ro

<http://imtuoradea.ro/smartmat/>

special sample preparation such as coating with metal films is required for hydrated

ATOMIC FORCE MICROSCOPE



The Agilent 5500 AFM/SPM microscope offers numerous unique features, such as patented top-down scanning and unrivalled environmental and temperature control, while providing maximum flexibility and modularity.

The universal microscope base permits easy integration with an environmental chamber or an inverted optical microscope. Sample preparation is made easy with our unique sample plates designed for your application including imaging in fluids.

A top-down optical axis through the scanner allows an unobstructed view of the cantilever and the sample without sacrificing sample handling. The scanner's modular nose cone makes changing imaging modes quick and easy.

The Agilent 5500 SPM/AFM is a high performance system that facilitates advanced applications solutions. It offers atomic resolution and is ideal for electrochemistry, polymers, and soft material applications.