RESEARCH AND DEVELOPMENT CENTER FOR
THERMOSET MATRIX COMPOSITES

CCDCOMT

UNIVERSITAS GALATIENSIS

"Dunărea de Jos" University of Galaţi

Cross-Border Faculty of Humanities, Economics and Engineering

111 Domnească Street, K building, 800201 Galaţi, România

RESEARCH AND DEVELOPMENT CENTER FOR THERMOSET MATRIX COMPOSITES

ABOUT

The RESEARCH AND DEVELOPMENT CENTER FOR THEMROSET MATRIX COMPOSITES (CCDCOMT) was established in 2016, within the Cross-Border Faculty of Humanities, Economics and Engineering, Department of General Sciences. The research, development and innovation (RDI) activities are carried out in the fundamental field of: MECHANICAL ENGINEERING/MATERIALS SCIENCE/ COMPOSITE MATERIALS AND STRUCTURES.

THE TEAM

Prof. dr. phys. Adrian CÎRCIUMARU – **Responsible**

Scientific Coordination Council:
Prof. dr. eng. Iulian - Gabriel BÎRSAN
Lecturer dr. eng. Vasile BRIA

EXPERTISE AREAS

Research-development-innovation main fields

A. Textile Reinforced Composites for Automotive Applications:

- Design and manufacture of reinforced composite materials with special properties on different types of demands;
- Design, manufacture and testing of composite materials reinforced with textiles made of fibers or bundles of artificial and natural fibers.

B. Properties design of composite materials with polymer matrix:

- designing the properties (mechanical, tribological, physical) of composite materials with thermosetting matrices;
- the study of the thermosetting polymer mixtures' properties in order to use them for the design of more efficient composites;
- designing the properties of composite materials with thermosetting matrices by designing the fabrics used for their reinforcement;
- the use of stationary magnetic fields for the nano-structuring of polymers by aligning some nanometric compounds with magnetic properties in the polymer matrix.

C. Composite materials with modified polymeric matrix:

- modifying the properties of polymer matrices (in order to improve the quality of composites) by various techniques;
- the use of amino acids for the functionalization of polymers;
- the use of amino acids' metal complexes for the functionalization of polymers;
- nanostructuring polymers by developing chemical reactions in the volume (liquid) of their pre-polymers;
- nanostructuring of polymers by the thermal degradation (microwave) of organic precursors dispersed in the volume (liquid) of their pre-polymers;
- nanostructuring of polymers by the electromagnetic degradation (laser) of some precursors dispersed in the polymer.

D. Formation and characterization of composite materials

Research-development-innovation secondary fields

A. The testing and characterization of materials
B. Multifunctional composite materials - obtaining multi-functional composites by applying innovative technical solutions
C. Tribology and tribocorrosion

Services/microproduction

A. Manufacture of composite materials
B. Manufacture of composite structures

Multidisciplinary and interdisciplinary research topics

A. The study of the thermosetting polymer mixtures' properties in order to use them to obtain nano-structures by electrochemical methods, which will be used to modify the properties of polymers;
B. Obtaining metal nanopowders by microbiological and biochemical processes, either as such or directly into the polymeric matrices;
C. Using microbiology and biochemistry techniques to improve the properties of natural fibers;
D. Optimizing the nanocomposite dispersion methods into polymer matrices;
E. Optimizing the composite materials' design by using numerical analysis and computer simulation models;
F. Optimizing the composite materials physical properties' design by using neural network techniques.

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OBJECTIVES

The assumed mission of the CCDCOMT center is to identify innovative technical solutions to obtain better performing composite materials, suitable for the automotive industry, shipbuilding, energy industry and to ensure, in compliance with all the environmental regulations, an increased operational safety level along with a high economic efficiency.

The scientific vision of the CCDCOMT center takes into account:

1. To establish a program of indirect research support actions, such as the training of researchers and engineers in the field of industrial rights and intellectual property.

2. To develop a marketing capacity in the field of innovation.

3. To facilitate the access to support and marketing services in the field of innovation. To encourage the acquisition and capitalization of intellectual property.

INFRASTRUCTURE

The infrastructure of the research center is presented on the ERRIS platform https://erris.gov.ro/Research-and-Development-Cen-1.

RELEVANT EQUIPMENT

1. Differential scanning calorimeter;
2. "INSTRON 8802" mechanical testing machine;
3. Thermomechanical analyzer;
4. Tribometer;
5. Optical system for measuring deformations (Aramis HS);
6. Digital LCR-meter with measuring cell;
7. TeraOhm meter;
8. Ultrasound generator.

The following laboratories are included in the CCDCOMT center (https://erris.gov.ro/Research-and-Development-Cen-1):

1. Laboratory of materials' strength
2. Laboratory of tribology
3. Laboratory of thermal analysis
4. Laboratory of electromagnetic analysis
5. Laboratory of formation
6. Laboratory of debiting
7. Laboratory of polymeric composites

CONSULTANCY, EXPERTISE AND SERVICES

From the competitiveness point of view on the testing and material characterization services' market, the activity of the CCDCOMT center is focused on accrediting as many analyzes as possible so that through the proposed activities the research unit becomes a credible partner on the local market.

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