

Habilitation Thesis Summary

CONTRIBUTIONS ON THE DEVELOPMENT OF NEW ECOLOGICAL INORGANIC MATERIALS

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The field of materials engineering has experienced exponential growth in recent decades, attracting more and more researchers.

Through its content, the habilitation thesis with the title *Contributions on the development of new ecological inorganic materials*, falls within current priority field of materials engineering.

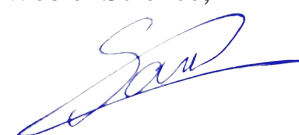
The habilitation thesis presents the most important achievements and development directions of the academic career, in the current context of international scientific research. Throughout my university career, from assistant to lecturer, I participated in teaching, administrative, scientific and research activities within the „Gheorghe Asachi” Technical University of Iași.

Thus, completing some complementary specialization and training modules gave me the opportunity to acquire skills necessary for inter- and transdisciplinary research activities, strengthening myself, both from a didactic and scientific point of view. The basic training as an engineer and the active involvement in scientific research projects allowed me to acquire and deepen the knowledge and skills specific to the field of Materials Engineering.

Specialization in modern analysis techniques (SEM, microFTIR, DSC, optical microscopy, profilometry, etc.) has opened new horizons and collaborations with top specialists from France, Poland, Malaysia, Thailand, Bulgaria, Spain and not only.

After obtaining the scientific title of doctor in the field of Materials Engineering (2012), my scientific activity was mainly oriented on the main research direction belonging to the targeted field: new inorganic ecological materials.

The results of the scientific research activity are valued in the form of 9 books, seven of which were published by CNCSIS-recognized publishing houses and two in the United States of America, 5 chapters in books published by the INTECH Open publishing house. Also I have published over 300 scientific articles in Journals with impact factor indexed by Web of Science,



97 articles being published in journals with an impact factor over 2, out of which at 80 articles at main author. Most of the last published articles are in red zone Q1 and yellow zone Q2 (more than 70). Hirsch index is 26, having more than 1800 citations (excluding self-citations). Also, to date I have coordinated one scientific research project as director, one project as scientific supervisor, one as director of an internal grant and being a member of 10 national and international projects. I was rewarded with numerous awards of excellence, as well as medals for patents, participating in international invention competitions and salons. The international recognition is also evidenced by the large number of proceedings where I am editor, guest editor in Q1 (Materials) and Q2 (Applied Sciences, Coatings, Crystals) areas, member of the editorial committee of some ISI indexed scientific journals, but also as a referent for more than 20 journals.

In parallel with scientific research, teaching activity is a significant part of my academic career. It is one of the ways in which I hope to strengthen the integrated training program to create a highly qualified human resource in the field of materials engineering. Academic career is based on professionalism, ethics, self-discipline and the idea of acquiring, building and disseminating knowledge accumulated through scientific research. The international network created, allows a strong development of a research team, which on a didactic level can provide qualified engineers in the newest fields of industry.

Chapter 1 presents the abstract of the thesis in both Romanian and English language.

In chapter 2, the milestones from professional life are presented, highlighting the internationalization, the didactic activity, the research activity realized through publications, research projects and awards, and finally the contributions in the field of materials science and engineering are presented.

Chapter 3 presents the research on geopolymers – an ecological alternative to Portland cement. These new sustainable materials are presented, along with their classification, but also some case studies, from the most recent publications. Thus, the compression resistance of new recipes is presented, namely the chemical and physical characterization of power plant ashes for use in geopolymers and lightweight materials, but also high temperature resistance, or even underwater activation and finally for heavy metal adsorption.

Chapter 4 presents the perspectives from a didactic point of view, focusing on the subjects in the portfolio and the diversification of materials for students and the related infrastructure, and respectively the research perspectives, with objectives and targeted activities to be fulfilled.

In the final part, the thesis presents the list of publications and patents.

