Heterogeneous Materials Research Group (GEMH)

Consolidation of (eco)materials at moderate temperatures: reaction mechanisms and process development
Ceramics preparation: processes and microstructures
Mechanical and thermal behaviour of heterogeneous materials: characterization and simulation
Civil engineering
Material and structure
Durability

Refactories
Hydraulic Binders
Cement Materials
Silicate Ceramics
Porous Materials
Thermal Insulators
Coatings and Enamels
Civil Engineering
Material and Structure

Durability
Risks - Solid and Material Mechanics
Structural Mechanics
Soil Mechanics
Mechanics of structural assembly

2012
This laboratory attached to the ENSCI (French National Engineering School for Industrial Ceramics) and the University of Limoges, brings together 25 university teachers from the two establishments. It is divided into 2 teams.

The “mineral materials” team (ENSCI - Limoges) studies the development and characterization of very-heterogeneous materials: refractories, hydraulic binders, raw mineral materials (silicate ceramics), porous materials for insulation and coatings.

The priority actions concern:

• the consolidation of materials at moderate temperature: reaction mechanisms and development of new processes;
• ceramic preparation: processes and microstructure: a) control of the microstructure of the products derived from natural raw materials, b) thermal aspects of processes;
• mechanical and thermal behaviour of heterogeneous materials: characterization and simulation.

The “Civil Engineering and Durability” team, based in Égletons, is specialized in:

• Roadway durability: diagnosis, behaviour under load, material fatigue
• Wooden structures for construction:
  - material behaviour, cracking,
  - behaviour of structures under load,
  - thermophysical behaviour of wooden walls.
KEY FIGURES
(at 1st January 2012)

University teachers: 26
Other researchers: 8
HDR (accredited to direct research): 10
Doctoral students in (2011/2012): 23
Engineers, technicians: 3
Administrative agents: 1
Projects: 3 including 2 ANR (French National Research Agency)
Others: 3 PRES projects (Further Education and Research Centre)

ECONOMIC ADDED VALUE
(2008-2011)

Number of patents filed:
5 under co-ownership
Number of industrial or research agreements with major organizations: 29
Start-up created as a result of research activities since 2005: Bibliontek
Conferences, seminars organized: 2 national and 1 international

PARTNERSHIPS

Active National University Partnerships:
LACCO, University of Poitiers
CEMHTI, University of Orleans
ICMCB, University of Bordeaux
LPTL, University of Paris (Jussieu)
LASI, University of La Rochelle

Current International University Partnerships:
Institute of Chemical Technology, Prague (Czech Republic)
North Rhine-Westphalia Technical University, Aachen (Germany)
University of Science and Technology, Krakow (Poland)
Montanuniversität Leoben, University of Leoben, (Austria) Nagoya Institute of Technology (Nagoya, Japan)
Max Planck Institute of Colloids and Interfaces, Potsdam (Germany)

National Industrial Partnerships:
ANR SETHER, ACOIFF Project, CERANANO ANR DEMETHER Project

Partnerships with National Organizations and Institutions:
CEA (French Atomic Energy and Alternative Energy Commission), CNES (National Centre for Space Studies)

Scientific Interest Groups (GIS):
Wood, Construction, Environment Geopolymers

Research Federation (RF):
FIRE, RILEM, FREDD, MATV2L
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Institute for Processes Applied to Materials (IPAM)

Doctoral School
ED 522: Materials, Mechanical, Energy and Aeronautical Science and Engineering

simmea.ed.univ-poitiers.fr/

SCIENTIFIC PRODUCTION OF RESEARCH TEAM (2008-2011)

Website publication: hal-unilim.archives-ouvertes.fr/GEMH
Articles: 117 international and 125 in peer-reviewed journals
Conference presentations: 214
Books: 1

Major publications and/or patents over the last 5 years

• R. Moutou Pitti, F. Dubois, C. Petit, N. Sauvat, O. Pop

• A. Michot, D. Smith, S. Degot, C. Gault

• M. Le Troedec, D. Sedan, C. Peyratout, J.P. Bonnet, A. Smith, R. Guinebretière, V. Gloaguen, P. Krausz

• B. Qi, J. Absi, N. Tessier-Doyen
  “Experimental and numerical study of the Young’s modulus vs temperature of heterogeneous model materials with polygonal inclusions”. Comp. Mat. Sci., 46 (4), 2009, 996-1001

• M. Takarli, W. Prince, F. Allou
  “Characterization of failure process in concrete using helium gas permeability measurement under compressive loading”. ASCE J. of Materials in Civil Engineering, 21, 2009

• C. Petit, M. Diakhate, A. Millien, A. Phelipot-Mardelé, B. Pouteau
  “Pavement design for turn road section international”. Road Materials and Pavement Design, 10 (3), 2009, 609-624


• J.M. Husson, F. Dubois, N. Sauvat

• F. Allou, C. Petit, C. Chazallon, P. Hornych

• G.L. Lecomte, J.P. Bonnet, P. Blanchart