Horizon2020 Information Days on Public-Private Partnerships

Brokerage event
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DEVELOPMENT OF CHARACTERIZATION METHODS FOR MINERAL RAW MATERIALS TO IMPROVE ENERGY AND RESOURCE MANAGEMENT SYSTEMS

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SPIRE
Sustainable Process Industry through Resource and Energy Efficiency

Terre et Pierre
Expertise et Innovation
CTMNC

CTMNC

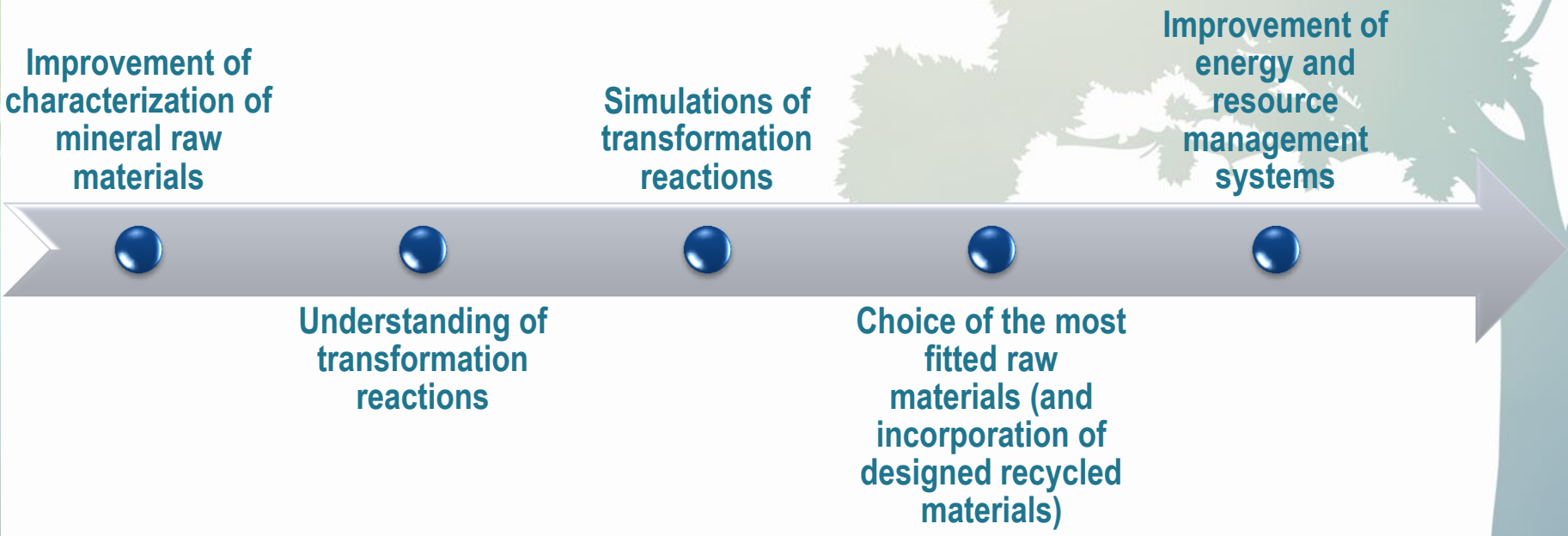
(Technical Center for Natural Building Materials)

- French Industrial Technical Center
  - To promote technical innovation and to participate in the improvement of industrial efficiency and in the development of product quality
  - Via joint research and development studies and project
  - In 2 industrial sectors:
    - fired clay building products (including earth bricks)
    - natural stone
  - Turnover : ~7,5M€
  - 65 employees (50% engineers and PhD)

- Areas of expertise
  - Raw materials characterization, process evaluation and simulation, products testing
  - Certification of products
  - Building-scale simulations (mechanical, thermal and acoustical behaviour)
  - Life-cycle assessment and environmental atmospheric measurements
  - Training

DEVELOPMENT OF CHARACTERIZATION METHODS FOR MINERAL RAW MATERIALS TO IMPROVE ENERGY AND RESOURCE MANAGEMENT SYSTEMS

- SPIRE Roadmap
  - FEED: KA1.1. and KA1.2:
    - ⇨ to improve the quality of raw materials and the use of secondary raw materials
  - PROCESS: KA2.3 and KA2.4
    - ⇨ to improve process monitoring and control for more efficient production systems
- SPIRE-06-2015: Energy and resource management systems for improved efficiency in the process industries



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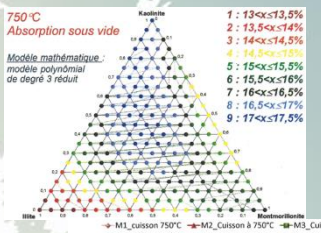
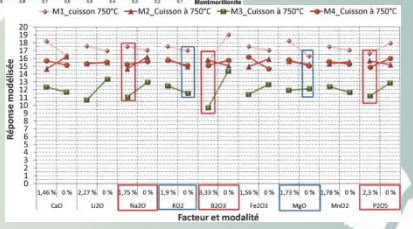
- Characterization of mineral raw materials
  - Methods:
    - Adaptated pretreatments according to the designated target
    - Quantitative XRD, DSC, chemical analysis
  - Understanding of interactions
    - Experimental designs
  - Proposal / selection of recycled materials as raw materials





- Characterization of mineral raw materials transformations (example of fired clay industry)
  - Shaping
    - Plasticity measurements
    - Density mapping
  - Drying
    - Water vapor permeability
    - Sorption/desorption behaviour
    - Young's modulus
    - Thermal conductivity
    - Porosity measurements
  - Firing
    - Shrinkage
    - Sintering temperature

EXPECTED IMPACT

- In relation to the call topic
  - "*New approaches that perform cost-saving optimisation of energy and resources supply and demand, in order to reduce the residues and costs in intensive industries, taking into consideration both economical and sustainability constraints*"
    - Resource consomption optimisation
    - Introduction of recycled materials will be facilitated
    - Energy savings as processes will no longer have to compensate for discrepancies in raw materials
    - Diminution of production residues

EXPECTED IMPACT

- In relation to the SPIRE Roadmap
  - Use, Re-use and Replace
  - 1.1: Enhancing the availability and quality of existing resources
    - Securing the quantities and quality of primary resources for materials and metals
  - 1.2: Optimal valorisation of waste and side streams as feed
    - Valorisation of inorganic waste and residue streams: Developing in-depth understanding of the reaction mechanisms will be required as a first step allowing maximum inorganic waste/residue uptake at similar product performances as state of the art technologies. Quality concepts, test procedures and product standards will be developed in parallel.
  - 2.3: Process monitoring, control and optimization
    - Simulation methods for the analysis, characterisation and study of systems, material, equipment and processes
  - 2.4: More efficient systems and equipment
    - Process understanding to enable rapid process design and precisely defined product quality

- Cross sectoral
  - The same characterization tools and methods can be used for different mineral raw materials
  - Actors from R&D labs, measurement tools designers, industrials

EXISTING PROJECT CONSORTIUM…

- No existing consortium for the time being
- CTMNC ready to join any existing consortium to share R&D efforts on the subject of mineral raw materials characterization

LOOKING FOR PARTNERS!

- To validate the characterization methods:
  - Industrials from minerals transformation industries
  - Industrials from other sectors having similar characterization needs
- To implement in energy and resource management systems
  - Laboratories with capabilities in modelization and simulation
  - Measurement equipment designers/producers
  - Industrials for pilot scale validation

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