



AGENCIA ESTATAL CONSEJO SUPERIOR
DE INVESTIGACIONES CIENTÍFICAS
(CSIC), Madrid, Spain

Key Focus Areas



1. Sustainable Materials

- Mix raw clay with waste to optimize formulations
- Reduce raw material usage



2. Enhanced Properties

- Improve thermal and acoustic performance
- Surface coating with nanoparticles for energy efficiency



3. Target Companies

- Envelope building producers
- Brick manufacturers
- Prefabricated materials manufacturers



Pilot Line 6: Innovative Ceramic Materials for the Construction Sector

Products

Bricks and other ceramics

Pilot Line Initiative



Objective: Develop new formulations for ceramic materials, specifically bricks, to enhance sustainability and efficiency in building construction and rehabilitation

Product Testing

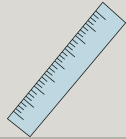
Mechanical Properties

- Compressive strength
- Flexural strength



Physical Properties

- Density
- Porosity
- Water absorption
- Thermal conductivity



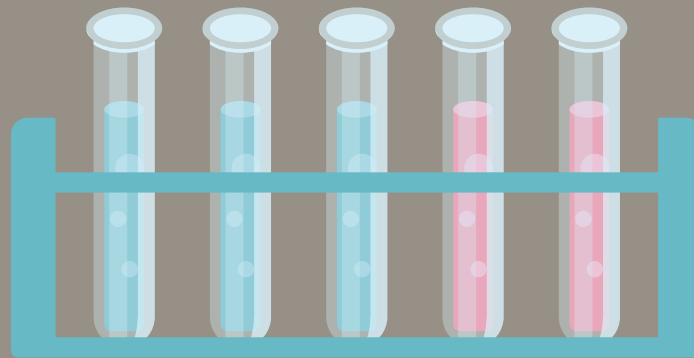
Sample Requirements

- **Final product:** Brick-sized samples
- **Raw materials:** Powder form



Characterization Techniques

- X-ray Diffraction (XRD)
- Scanning Electron Microscopy (SEM)
- Spectroscopy Techniques
- Porosimetry



Nanomaterials Study

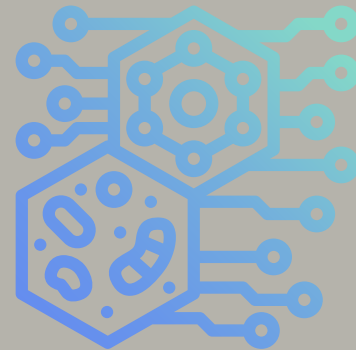
Microstructure Effects on Materials:

1. Adsorption-Desorption Isotherms

2. Laser Technology

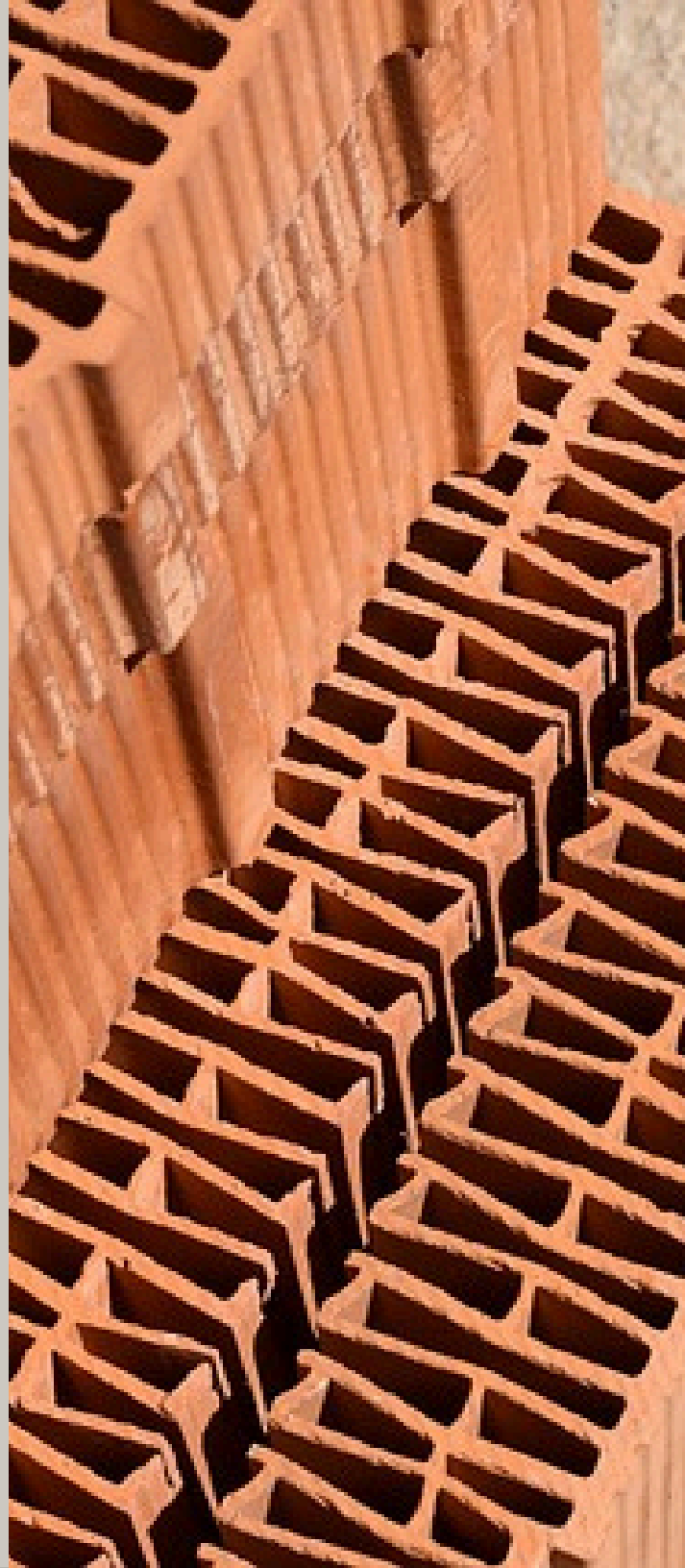
3. Nanoindentation

4. Reflectance & Transmittance Measurements



Advantages

- New formulations for bricks and tiles.
- Reduced grey energy through the use of recycled and waste materials.
- Comprehensive characterization and testing available for materials, mixtures, and final products.



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