

COOLSPACES

Kick off meeting
October 13th, 2021



University of Almeria, Spain



Group from the University of Almeria

Researchers

Francisco Javier Batlles



María Jesús Ariza



Antonio Manuel Puertas



Manuel Servando
Romero-Cano



Laboratory technician



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Expertise

Bioclimatic Architecture and Solar Cooling (ARFRISOL)

Strategic Singular Scientific Technological Project funded by the National Plan of Research and Development and cofinanced by FEDER (2005-2011).

Achivement: Building of CIESOL



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Expertise

Módulo piloto polivalente para evaluación optimización y mejora de los sistemas de frigoconservación agroalimentaria con energías renovables

Ministerio de Economía y Competitividad, cofunded with ERDF (2015-2017).

Achivement: Building of three refrigerated chambers



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Expertise

Thermal energy recovery from a novel sequencing batch biofilter granular reactor (THERBIOR)

ERA-NET Co-fund WaterWorks2014 (01/04/2016-30/03/2018).

Participants: UAL (Spain) – CNR (Italy) – 2.0 LCA consultants (Denmark) – Hedera Helix (Spain)



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Expertise

Thermal Energy Storage with Phase Change Materials for Solar Heating and Heating Applications: A viable technology. Analysis (PCMSOL)

ERANET-LAC Joint Call 2015-2016

ELAC2015/T06-0988 (2016-2020)

Participants: UA (Chile) – UCB (Bolivia) –
WUST (Poland) – Hedera Helix (Spain) – UAL
(Spain)



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Responsibilities within COOLSPACES

ACTION A.4: Determination of EPCM thermophysical parameters

Execution time: 01.09.2021 – 31.05.2023

ACTION C.7: Reproduction and assembly of the solar-powered cooling device to Spain; prototype validation

Execution time: 01.04.2023 – 30.06.2024

ACTION C.8: Annual system operation tests at CIESOL ?? p113 & p144

Execution time: 01.04.2024 – 30.09.2026

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Responsabilities within COOLSPACES

ACTION A.4:

Manuel S. Romero-Cano
María Jesús Ariza
Laboratory technician

F. Javier Batlles
Antonio M. Puertas

ACTION C.7:

ACTION C.8:

F. Javier Batlles
Antonio M. Puertas
Laboratory technician

Manuel S. Romero-Cano
María Jesús Ariza

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Responsabilities within COOLSPACES

Deliverables:

ACTION A.4: Report on EPCM selection.

Scheduled for 31/05/2023

ACTION C.8: Report on the solar-powered BC prototype's installation progress at UAL site.

Scheduled for 31/08/2026

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Responsabilities within COOLSPACES

Milestones:

ACTION A.4: EPCM determination for the STES.
Scheduled for 05/2023

ACTION C.7: Solar-powered BC system installed and running at UAL site
Scheduled for 05/2024

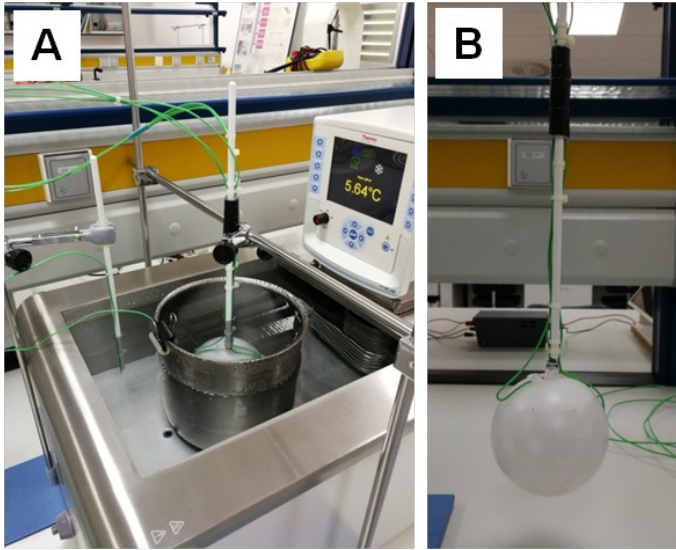
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ACTION A.4: Determination of EPCM thermophysical parameters
(Execution time: 01.09.2021 – 31.05.2023)

- Temperature range for charging/discharging
- Commercial EPCMs: (type? Encapsulation?)
- Shape of the PCM capsules/nodules
- Other details?

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ACTION A.4: Determination of EPCM thermophysical parameters
(Execution time: 01.09.2021 – 31.05.2023)



T-history method

Material characterization of
PCM and encapsulation

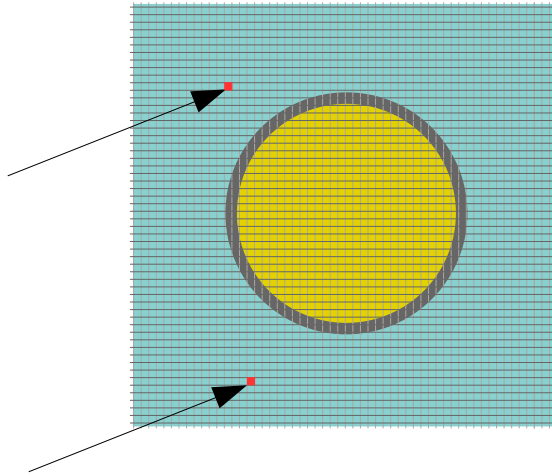
New set-up with several
nodules, or with flow of HTF?

Kinetics of freezing/melting of a single nodule

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ACTION A.4: Determination of EPCM thermophysical parameters
(Execution time: 01.09.2021 – 31.05.2023)

Conduction with MonteCarlo solution of NS equation



Simulation set-up

$$\rho c_p \frac{\partial T}{\partial t} = k \nabla^2 T + \dot{q}$$

Agreement with experiments in water or in S10

Validation of physical parameters

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Thank you for your attention and ...

thanks for setting up this project