Task 48
Thermal Energy Storage Materials

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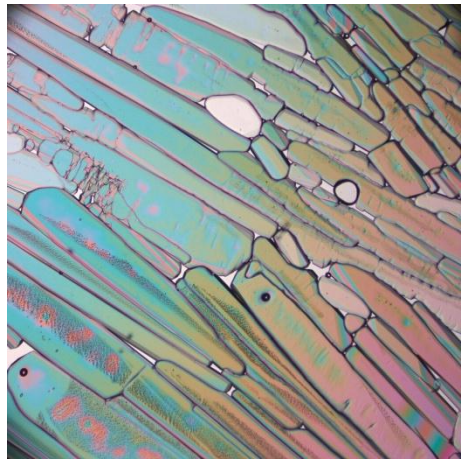
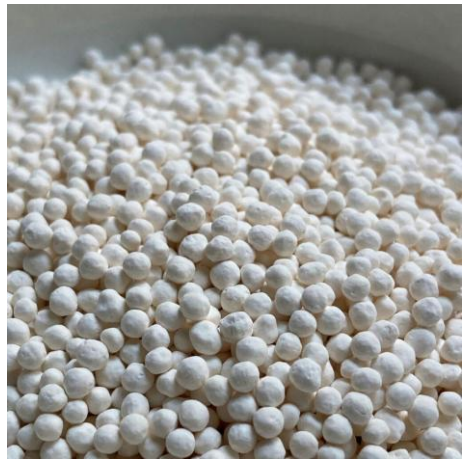
Preface

- IEA ES TCP Task 48 is a joint activity with IEA SHC Task 75.
- Task 48 and Task 47 (TES Components) will have shared Task meetings.
- Visit iea-es.org to find out more about ES TCP Tasks.

Scope

Thermal energy storage materials

- Phase Change Materials (PCM)
- Thermochemical Materials (TCM)
- High-temperature sensible heat storage materials



Activities

- Material characterization
- Material development
- Material synthesis and production

Goals

- Develop **measurement guidelines** for material properties.
- Provide an overview of **new and innovative TES materials** and related **synthesis and production methods.**
- Establish a high-quality **TES materials database and Wiki.**
- Disseminate **lessons learnt**, also findings from previous Tasks on compact TES.

Subtasks and Subtask Leaders

A: Lessons learnt	Frédéric Kuznik, INSA Lyon, France
B: Material characterization	Daniel Lager, AIT, Austria
C: Material development & production	Saman N. Gunasekara, KTH, Sweden
D: TES material database	Alenka Ristic, NIC, Slovenia

A: Lessons learnt

Frédéric Kuznik, INSA Lyon, France

A.1 Selection and discussion of lessons learnt

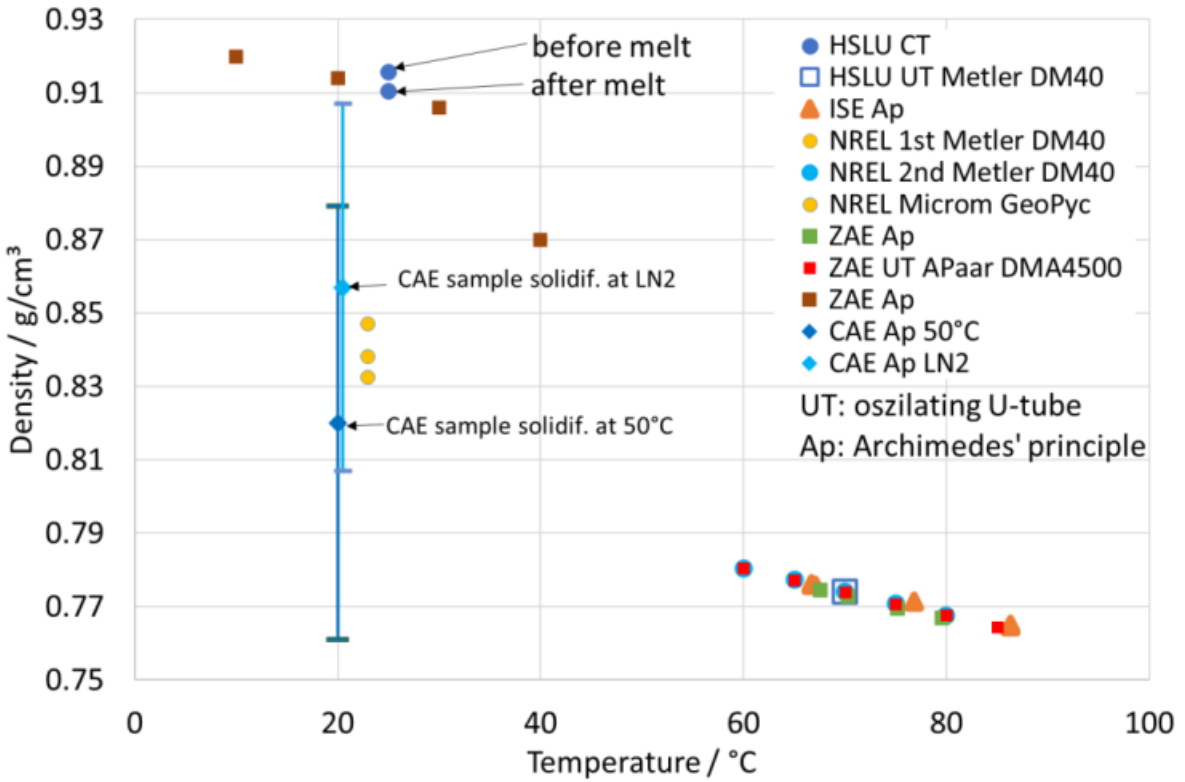
A.2 Dissemination/publication of lessons learnt

Examples

- “Develop measurement guidelines (pre-standards) through round robin tests.”
- “Use the 4-temperature-approach to characterize TCM under application conditions.”
- “What are the limits (physical, economical etc.) of TES materials development?”
- *…and more, also connected to Tasks 46 (AppESS) and 47 (TES components)*

B.1 Development of measurement guidelines through round robin tests

- Properties and round robin tests tbd.



Example: Round robin test on density of PCM (source: Task 40 Final Report)

C: Material development & production

Saman N. Gunasekara, KTH, Sweden

C.1 Systematic development of materials

- Translating application requirements into material development targets
- Structuring materials (material classes) and common requirements

C.2 Synthesis and production of materials

- Production of materials from waste, by-products, sustainable resources
- Alternative synthesis methods to avoid certain basic raw materials

C.3 Upscaling materials production

D: TES material database

Alenka Ristic, NIC, Slovenia

D.1 TES Materials database

D.2 TES materials Wiki

Thermal Materials Database

PCM TCM Christoph Rathgeber

List view | How to use | Definitions | Wiki PCM | Add new material | Contact

Search

Filter

Material type:

Measurement standard:

Commercial Non-Commercial

Range filter

Melt. temperature 19.03 - 632.32 °C

Endothermic heat flow 125.40 - 240.00 kJ/kg

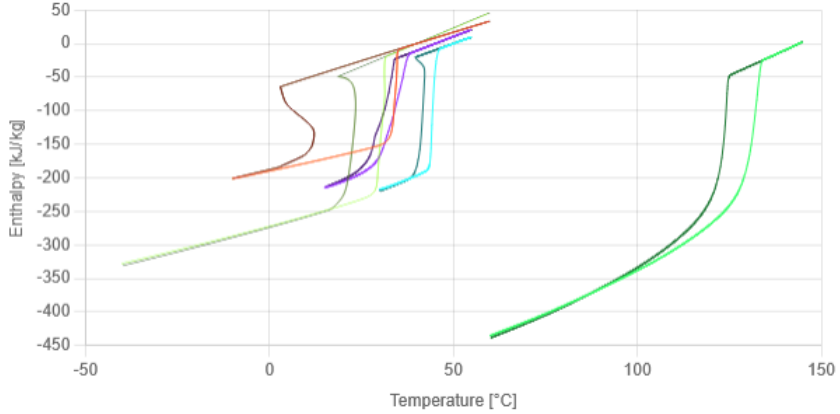
Viscosity[1] 43.10 - 63.10 mPas

Density[1] -9.07 - 10.93 kg/m³

Reset filter Clear graph

Name	Melting temperature	Endothermic heat flow	Density[1]	Thermal conductivity[1]	Material type	Institution	Last update	Compare	Status	Visibility
Calcium bromide hexahydrate	33.27 °C	135.47 kJ/kg	-	-	Non organic	ZAE Bayern	23.07.25	☑	Review	Internal
Calciumbromid Hexahydrate	33.28 °C	135.4 kJ/kg	0.93 kg/m³	-	Non organic	Fraunhofer ISE	30.04.25	☑	Published	Public
Calcium chloride hexahydrate with nucleating agent	29.03 °C	199.13 kJ/kg	-	-	Non organic	ZAE Bayern	15.10.25	☑	Published	Internal
HDPE natur NT D960/6	128.68 °C	230 kJ/kg	-	-	Organic	Fraunhofer Institut	30.04.25	☑	Published	Public
Lauric Acid	43.47 °C	178.2 kJ/kg	-	-	Organic	ZAE Bayern	25.06.25	☑	Review	Internal
Palmitic acid	62.6 °C	182 kJ/kg	-	-	Organic	Universitat de Lleida	15.10.25	☑	Published	Internal
PEG 1000	30.75 °C	150.25 kJ/kg	-	-	Organic	Fraunhofer ISE	12.02.25	☑	Published	Internal
Sodium nitrate	622.32 °C	167.69 kJ/kg	-	-	Non organic	Universitat de Lleida	15.10.25	☑	Published	Internal

Compare materials: Enthalpy



- Calcium bromide hexahydrate: Heating/cooling enthalpy measurement 1
- Calciumbromid Hexahydrate: Heating/cooling measurement 1
- Calcium chloride hexahydrate with nucleating agent: Heating/cooling enthalpy measurement 1
- HDPE natur NT D960/6: Heating/cooling measurement 1
- Lauric Acid: Heating/cooling enthalpy measurement 1
- Palmitic acid (No data available)
- PEG 1000: Heating/cooling enthalpy measurement 3
- Sodium nitrate (No data available)

Timeline

• Start of Task	1 July 2025
• End of Task	30 June 2028
• Kickoff Meeting	13–15 October 2025, KTH, Stockholm, Sweden
• **2nd Experts Meeting**	**11–12 May 2026, Univ. of Lleida, Spain**
• 3rd Experts Meeting	Autumn 2026, date and location tbd.
• 4th Experts Meeting	Spring 2027, date and location tbd.
• 5th Experts Meeting	Autumn 2027, date and location tbd.
• Final Experts Meeting	Spring 2028, date and location tbd.

Contact

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