

Materials research on molten salt heat storage and transfer technologies (MSTs) for industry decarbonization

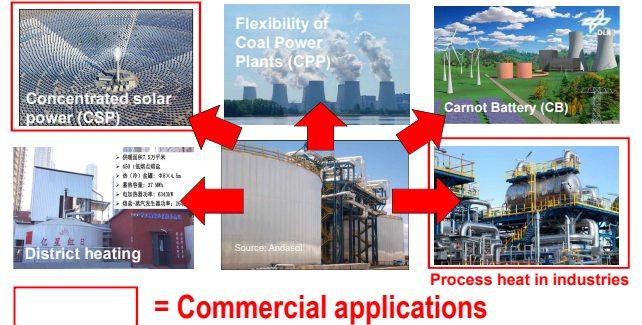
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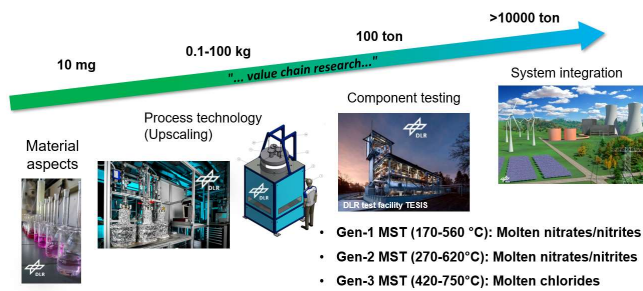
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Applications of MSTs for Decarbonization

- Commercial applications and demonstrations of MSTs:**
 - ✓ **Process heat in industries** (>500 commercial MST systems),
 - ✓ **Concentrated solar power CSP** plants (~2GW_{el}/50GWh_{th}, CAPEX: <25 Euro/kWh),
 - ✓ **Carnot Battery** for grid storage (under demonstration),
 - ✓ Increasing **flexibility of coal power plants** (under demonstration),
 - ✓ **Clean district heating** using excess electricity (under demonstration).
- DLR has long-term experience in R&D of MSTs with industries.**
- Materials research on molten salts** (e.g., materials selection and compatibility) is essential in development of MSTs for new applications.



MST Group and Materials Labs in DLR



Group for value chain research of MSTs in DLR

- From material via component to system level
- Three generations MSTs



Three well-equipped MST materials labs in DLR (Technical, Chemical and Thermophysical)

Materials research of MSTs in DLR

Molten Nitrates/Nitrites MSTs (Gen-1 and 2)

- Focusing on **corrosion control** and **increase working temperature** for improved heat storage/transfer performance,
- Ongoing projects with industrial partners to increase TRL, e.g., development of key components based on materials research.

Molten chloride MST (Gen-3)

- Focusing on **corrosion control** and **structural materials & salts selection**,
- Lab-scale molten salt loop with corrosion control system (CCS) and Scaling-up in progress.

Basic materials research on e.g., corrosion and thermodynamic salt data is essential for MST technology development

- Safe operation** of commercial Gen-1 MST systems,
- Progress toward **higher temperatures** for Gen-2 and Gen-3 MSTs,
- Development of e.g., **corrosion control technologies and products**.

MSTs have promising applications in industry decarbonization.

