

Molten Salt Storage for flexibilization of the Future Energy System – Activities at the German Aerospace Center (DLR)

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Abstract:

Thermal Energy Storage (TES) will play a crucial role for the large-scale implementation of renewable energy and the provision of dispatchable electricity in the future. In existing Solar Thermal Power plants, TES systems based on molten salts have been successfully implemented in the GWh-scale and can transform peak-load solar energy into intermediate or even base-load by storing large amounts of energy efficiently. Molten Salt storage systems exhibit an extremely high degree of flexibility in terms of sizing of power and capacity, have very low cost (20 USD/kWh) compared to electric storage solutions, and are inherently compatible with thermal processes. The inherent flexibility opens new fields of applications for Molten Salt systems, such as the flexibilization of Coal-fired power plants into Storage Plants, usage of TES as Carnot Batteries, or its use as a waste-heat recovery system.

At DLR, the group “Thermal Systems for Fluids” has investigated molten salts within application-focused R&D activities since more than 30 years. Since almost a decade, research has been focusing on molten nitrate/nitrite salts and molten chloride salts for high temperature storage options and covers the value chain from material aspects to system level integration. The latest developments from materials to components and systems for Molten Salt Storage will be presented.