Development of seasonal heat storage based on stable supercooling of a sodium acetate water mixture

A number of heat storage modules for seasonal heat storages based on stable supercooling of a sodium acetate water mixture have been tested by means of experiments in a heat storage test facility. The modules had different volumes and designs. Further, different methods were used to transfer heat to and from the sodium acetate water mixture in the modules.

By means of the experiments:
- The heat exchange capacity rates to and from the sodium acetate water mixture in the heat storage modules were determined for different volume flow rates.
- The heat content of the heat storage modules were determined.
- The reliability of the supercooling was elucidated for the heat storage modules for different operation conditions.
- The reliability of a cooling method used to start solidification of the supercooled sodium acetate water mixture was elucidated. The method is making use of boiling CO2 in a small tank in good thermal contact with the outer surface of the heat storage module.
- Experience on operation of the heat storage modules was gained.

Based on the investigations recommendations for future development of a seasonal heat storage based on stable supercooling of a sodium acetate water mixture are given.