

The Optimisation of Salt Impregnated Matrices as Potential Thermochemical Storage Materials

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Abstract : Thermochemical storage utilises chemical salts which store and release energy a fully reversible endo/exothermic chemical reaction. Highly porous vermiculite impregnated with CaCl₂, LiNO₃ and MgSO₄ (SIMs - Salt In Matrices) are proposed as potential materials for long-term thermochemical storage. The behavior of these materials during typical hydration and dehydration cycles is investigated. A simple moisture experiment represents the hydration, whilst thermogravimetric analysis (TGA) represents the dehydration. Further experiments to approximate the energy density and to determine the peak output temperatures of the SIMs are conducted. The CaCl₂ SIM is deemed the best performing SIM across most experiments, whilst the results of MgSO₄ SIM indicate difficulty associated with energy recovery.

Keywords : hydrated states, inter-seasonal heat storage, moisture sorption, salt in matrix

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