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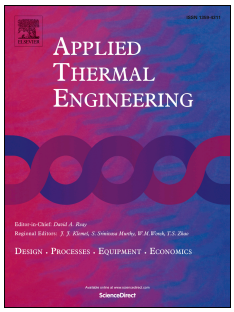

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Numerical Analysis of Metal Hydride Tank with Phase Change Material

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Abstract

This study discusses the challenges of using heat and hydrogen storage system consisting of a Metal Hydride Tank (MHT) equipped with a Phase Change Material (PCM). A mathematical model was developed to study the bi-dimensional coupled heat and mass transfer inside the hydride bed as well as the PCM domain. The numerical computations have been conducted for two configurations (cylindrical and spherical tanks). Compared to cylindrical tank, the spherical one has the highest MHT-PCM system performance. Additionally, the results have shown that the PCM amount should be carefully optimized. Moreover, the results concerning the impact of MHT-PCM thermal insulation were also discussed.

Keywords:

Hydrogen storage, Metal hydride**,** Heat storage**,** phase change material (PCM)