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Numerical Analysis of Metal Hydride Tank with Phase Change Material

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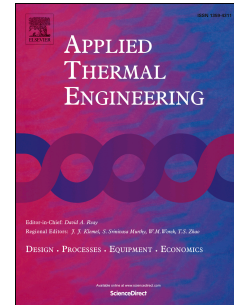
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2 **Material**

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10 ***Abstract***

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

20 **Keywords:**

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

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