عنوان مقاله:

Numerical study of a PCM finned-tube and shell LHTES: effects of HTF temperature and velocity

محل انتشار:

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خلاصه مقاله:

Using thermal energy storage systems containing phase change materials (PCMs) is one of the productive strategies to store and reduce wasting energy. In addition, in the critical conditions of energy producing systems, a balance between supply and demand isobtained. PCMs have the capability to store a large amount of thermal energy due to their high latent heat. In the present study, the effects of the inlet heat transfer fluid (HTF) temperature and velocity on the energy storage and the charging time in a vertically threedimensional finned-tube and shell are studied numerically using enthalpy-porosity technique and Finite Volume Method (FVM). The results revealed that increasing the inlet temperature from 333 K to 338 K and from 338 K to 343 K causes the energy storage to increase by 3.41% and 3.07%, respectively. Raising the inlet velocity from 0.05 m/s to 0.2 m/s results in decreasing the charging time up to a maximum of 11.11%. With increasing the inlet velocity from 0.05 m/s to 0.2 m/s, the energy storage in the PCM is grown up toa maximum value of 0.83%.

کلمات کلیدی:

pcm, fin, shell and tube, energy storage system

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