

Analysis on the heat storage unit through a Y-shaped fin for solidification of NEPCM

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Highlights

- Heat storage unit with Y shaped fins for solidification of NEPCM was examined.
- Galerkin FEM was applied to determine the numerical outcomes.
- Dispersing nanoparticles is beneficial way for augmenting discharge rate.
- An excellent graphical comparison was present to validate the current results.

Abstract

The primary goal of current research is the expedition of the discharging process with the use of Al_2O_3 -nanoparticles and Y-shaped fins. The nanoparticle can be dispersed in a PCM to eliminate the limitations of them. Newton-Raphson scheme with a combination of Finite element method were implemented to discuss the novel outcomes of the present analysis. A powerful numerical approach is involved in simulating time-dependent phenomena in a complex geometry. Outcomes prove that dispersing nanoparticles is a good way of enhancing the discharge rate. As the radius of nanoparticle augments up to 20 nm, total energy decreases and profile has been converged in lower time. A comparison reveals that the outputs have excellent agreement with the experimental results.