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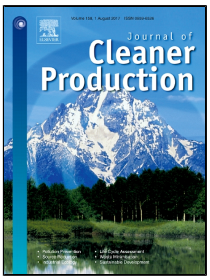

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Modeling and investigation of high temperature phase change materials (PCM) in different storage tank configurations

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In recent years, one of the most actual issues is improvement of the energy-saving technologies. Using specific materials in the specific temperature range as phase change material (PCM) allows using latent heat for storage thermal energy. This is one of the most efficient ways of storing thermal energy. In this paper, charging process of high temperature PCMs in three different configurations is modeled. Ten different PCMs which are Sodium, Potassium and Lithium salts are compared and three configurations of latent heat thermal energy system units for each PCM are investigated. Effect of the heat transfer fluid (HTF) velocity is also examined. The time required for charging the tank for the considered PCMs is calculated. Among these materials LiF(33)-67KF requires just 15 hours for completely charging while NaCl(33)-67$CaCl_2$ needs more than 30 hours. Results show that ratio of surface area to volume of PCM domain plays an important role in tank charging time and increasing HTF velocity decrease charging time but not always.

Keywords: *Phase change materials (PCM), Modeling, Charging, Heat transfer fluid, Energy storage, heat transfer fluid (HTF)*

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