

## **Thermo-physical properties and corrosivity improvement of molten salts by use of nanoparticles for concentrated solar power applications: a critical review**

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### **ABSTRACT**

Molten salts (MSs) are known for their advantages, such as being cheap, abundant in supply and can be operated at high temperatures. These advantages permit them for potential application as sensible storage media and heat transfer fluid (HTF) for concentrated solar power (CSP) plants. However, the thermal energy storage (TES) and corrosion properties of certain MSs are inadequate and in need of improvement. The present review focuses on how to improve these properties, i.e., mixing suitable nanomaterials (NPs) with different concentrations for improved performance. Based on the literature study, addition of a trivial amount of NPs into the base salts could increase their specific heat capacity ( $C_p$ ) and enhance the thermal conductivity (up to 300%) considerably. In addition, several other investigations have also reported a reduction in corrosion rate due to the addition of NPs into the base salt. However, the addition of NPs increases fluids viscosity. The increase in viscosity is undesirable, as it increases the pumping power and friction factor that directly influences the operating cost. Besides, the sedimentation of nanoparticles in the fluid is another issue that requires systematic investigation.

### **KEYWORDS**

Concentrated solar power; Molten salts; Nanoparticle; Heat capacity; Thermal stability; Corrosion

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