

## CHARACTERIZATION AND APPLICATION OF PHASE CHANGE ENERGY STORAGE MATERIALS (PCMs)

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### ABSTRACT

Globally it is a challenge to conserve available energy and improve its utilization, as many energy sources are intermittent in nature. In most applications short term energy storage is required while in some applications long term storage of a few months may be required. Latent heat storage is one of the most efficient ways of storing thermal energy. The latent heat storage method provides a higher storage density for a long time with a smaller temperature difference between storing and releasing heat. Phase Change Materials (PCMs) are one of the most important passive Latent Heat Thermal Energy Storage (LHTES) phase change systems. This paper reviews where and how PCMs are used in LHTES systems. A survey on research trends of the application of phase change materials (PCMs) is presented and followed by the discussion of difficulties arising in the packaging and processing of these materials. Now a days phase change materials are of commercial interest for their use in almost every field of life. The applications of phase change materials (PCMs) in free heating and cooling in residential and commercial buildings, in reduction of CO<sub>2</sub> emissions due to free cooling, providing thermal protection in both hot and cold environment, textile industries, in rewritable optical disks, in reducing the peak power load and as non-volatile memories, etc., are also discussed in the paper.

**Key words:** Energy storage, Latent heat, Thermal energy, Phase Change Material (PCM), Latent Heat Thermal Energy Storage (LHTES).

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