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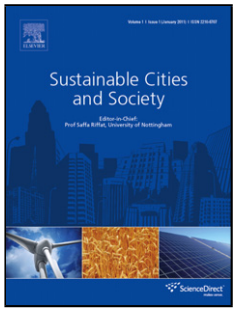

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Integration of Passive PCM Technologies for Net-Zero Energy Buildings

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Abstract

Due to the increasing energy demand for space heating and cooling, renewable energy power generation and integration of energy storage systems received attention around the world. A method to reduce energy demand of buildings is the application of thermal energy storage (TES) systems. This is due to the possibility of storing heat/cold energy to release it when required, which can tackle the temporal gap between energy demand and supply. In this work, phase change materials (PCMs) have been considered as a useful passive method. In the summer, PCMs can absorb the excessive heat during day time and release the stored heat during night time. A composite wall filled with different PCMs was developed and analysed using TRNSYS software with the purpose of integration into passive near zero building applications. The results show that the PCMs in walls can reduce building energy use on daily basis and help achieving the goals of a net zero energy building (NZEB) in future.

Keywords: Passive cooling, phase change material (PCM), net zero energy building (NZEB), TRNSYS

Nomenclature

Units

c	Specific heat	J/kg.K