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Thermal performance of a hybrid BIPV-PCM: modeling, design and experimental investigation

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Abstract

In this paper, a BIPV-PCM installed in an office building façade is investigated to approach the practical application of PV-PCM. Based on an updated mathematical model, theoretical simulation has been conducted for BIPV-PCM in this case. Furthermore, field testing for this case has also been performed to validate the model, and then the simulated and experimental results are compared and found in considerably good agreement. The experiments have been conducted during the winter time, as the prototype has been installed in January 2013. The experimental and numerical results show a good agreement, the maximum electrical efficiency of this BIPV-PCM can reach 10% and the thermal one 12%.

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1. Introduction

Increasing energy consumption, shrinking resources and rising energy costs have significant impact on our standard of living for future generations. In this situation, the development of alternative, cost effective sources of energy for residential and non-residential buildings has to be a priority. Designing energy efficient and affordable solutions integrated in buildings dealing with summer and winter climate challenges represents a very ambitious

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