

## **Numerical study of thermal behavior of phase change Material used as thermal insulation layer.**

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### **Abstract:**

The use of phase change material (PCM) within walls can decrease the building energy consumption and improve the thermal comfort, by enhancing both the thermal inertia and the thermal energy storage capacity of building envelope. This paper perfectly fits in the current sustainable development; it presents a numerical study of one-dimensional heat conduction and melting process in brick-and-PCM layers. The mathematical modeling is based on one-dimensional unsteady heat conduction equation. The numerical solutions are given by the enthalpy porosity formulation with heat convection boundary condition. The explicit finite difference method is used to solve the governing equation by using a fixed grid discretization. The dimensionless formulation made possible to identify the main parameters affecting of the heat transfer like as Biot number (Bi), Stephan number (Ste).

**Keywords:** Phase change material; wallboard; Enthalpy porosity equation; Thermal comfort.