# Thermal properties of beeswax/cuo nano phase-change material used for thermal energy storage

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Abstrak

Experimentation on and implementation of phase-change materials for thermal storage is attracting increasing attention by those seeking a potential resolution to energy issues. This study investigates beeswax as a high thermal-capacity phase-change material with the objective of analyzing the thermal properties and behaviors of beeswax/CuO nano-PCM. The study uses differential scanning calorimetry apparatus to measure the melting temperature and thermal capacity of nano-PCMs. The study found nano-PCM melting temperatures of 63.62°C, 63.59°C, 63.66°C, 63.19°C, and 62.45°C at 0.05, 0.1, 0.15, 0.2, and 0.25 wt%, respectively. FTIR testing found no chemical reaction between CuO and beeswax. The existence of CuO nanoparticles enhanced thermal conductivity of beeswax but reduced its heat capacity. However, the change in latent heat caused no significant effects in the performance of beeswax/CuO. Thus, the results showed that heat transfer of composite beeswax/CuO melts faster than base phase-change material