

Synthesis of Phase Change Material-Polypyrrole Core-Shell Nanocapsules via Fe³⁺-Oxidative Polymerization

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In this work, we have proposed a facile method for preparing PCM-PPy core-shell nanocapsules via Fe³⁺-oxidative polymerization in miniemulsion system. This facile method includes a FeCl₃/H₂O₂ (catalyst/oxidant) combination system as oxidants. Conductive polymer, PPy, was selected as a shell material for protecting of PCM and enduing the conductivity. Morphology and core structure of the PCM-PPy core-shell nanocapsules were confirmed by scanning electron microscopy (SEM) and transmission electron microscopy (TEM), respectively. The size distribution of nanocapsules was confirmed by dynamic light scattering (DLS). The amount of heat storage and the thermal behavior of PCM-PPy nanocapsules were analyzed by differential scanning calorimeter (DSC). Electrical conductivity of PCM-PPy nanocapsules was analyzed by 4-probe conductivity meter.