

## Encapsulated Phase Change Material in Conducting Polymer for Latent Heat Thermal Energy Storage

박상필<sup>1</sup>, 류현욱<sup>1,2</sup>, 이영민<sup>1</sup>, 정인우<sup>3</sup>, 김중현<sup>1</sup>, 고원건<sup>1,\*</sup>  
<sup>1</sup>연세대학교 화공생명공학과; <sup>2</sup>기능성 초미립자 공정연구실;  
<sup>3</sup>경북대학교  
(wongun@yonsei.ac.kr\*)

A thermal energy storage system employing Phase change material (PCM, octadecane) for rapid heat discharge was studied numerically and experimentally. In the numerical studies, the PCM was encapsulated in polypyrrole for nvestigating the effects of geometrical configurations. The effects of the surfactant for capsulation and the void fraction on the performance of the heat storage system were also investigated.

PCM have been coated with overlayers of polypyrrole from aqueous solution which is prepared by Fe<sup>3+</sup>-catalyzed oxidative polymerization in miniemulsion system. PCM-PPy core-shell nanoparticles were confirmed by scanning electron microscope (SEM) and Transmission Electron Microscope (TEM). Amount of heat storage and thermal behavior of PCM-PPy nanoparticles were analyzed by differential scanning calorimetry (DSC). Electrical conductivity PCM-PPy nanoparticle was analyzed by 4-probe conductivity meter.