

PREPARATION AND CHARACTERIZATION OF POLYMER ENCAPSULATED PARAFFIN WAX TO BE USED AS A PHASE CHANGE MATERIAL FOR ENERGY STORAGE

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ABSTRACT

This study deals with the preparation and characterization of polystyrene (PS) capsules containing a soft Fischer-Tropsch paraffin wax as phase change material for thermal energy storage and polypropylene (PP) as a matrix. The morphology, chemical characterization, dynamic mechanical properties, thermal stability, and thermal properties were studied by scanning electron microscopy (SEM), FTIR, dynamic mechanical analysis (DMA), TGA and DSC respectively. The capsules were regular and spherical in shape, which is what was expected from the morphological point of view. The dynamic-mechanical properties of the blends show a drop in the storage modulus with increasing PS:M3 wax content, suggesting a plasticizing effect of the capsules on the blends. All the characteristic peaks of the M3 paraffin wax and the polystyrene were observed in the FTIR spectrum of the encapsulated PCM, and the DSC results of the blends clearly show the separate melting peaks of the wax and PP.