

Preparation of polydivinylbenzene/natural rubber capsule encapsulating octadecane: Influence of natural rubber molecular weight and content

Author(s): Chaiyasat, A (Chaiyasat, A.)¹; Waree, C (Waree, C.)¹; Songkhamrod, K (Songkhamrod, K.)¹; Sirithip, P (Sirithip, P.)¹; Voranuch, V (Voranuch, V.)¹; Chaiyasat, P (Chaiyasat, P.)¹

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Abstract: The encapsulation of octadecane (OD) as heat storage material was studied. The core-shell polydivinylbenzene (PDVB)/natural rubber (NR) capsules encapsulating OD was prepared using the Self-assembling of Phase Separated Polymer (SaPSep) method by suspension polymerization. The mixture of dispersed phase consisting of DVB, NR, OD and benzoyl peroxide was added in polyvinyl alcohol aqueous solution and then homogenized at 5,000 rpm for 5 minutes. The obtained monomer droplet emulsion was subsequently polymerized at 80 degrees C for 8 hours resulting in PDVB/NR capsule encapsulating OD. The influence of molecular weight and content of NR on the encapsulation efficiency and thermal properties of the encapsulated OD were investigated. It was found that both factors affected on the preparation of PDVB/NR/OD capsule. High molecular weight NR restricted phase separation of formed PDVB. High NR content also reduced phase separation of PDVB due to the increase of internal viscosity. Then, only the incorporation of appropriate molecular weight and content of NR resulted in the formation of PDVB/NR/OD capsule.

Addresses:

1. Rajamangala Univ Technol Thanyaburi, Dept Chem, Fac Sci & Technol, Thanyaburi 12110, Pathumthani, Thailand

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