World Academy of Science, Engineering and Technology
International Journal of Aerospace and Mechanical Engineering
Vol:9, No:06, 2015

Numerical Investigation of Thermally Triggered Release Kinetics of Double Emulsion for Drug Delivery Using Phase Change Material

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Abstract : A numerical model has been developed to investigate the thermally triggered release kinetics for drug delivery using phase change material as shell of microcapsules. Biocompatible material n-Eicosane is used as demonstration. PCM shell of microcapsule will remain in solid form after the drug is taken, so the drug will be encapsulated by the shell, and will not be released until the target body part of lesion is exposed to external heat source, which will thermally trigger the release kinetics, leading to solid-to-liquid phase change. The findings can lead to better understanding on the key effects influencing the phase change process for drug delivery applications. The facile approach to release drug from core/shell structure of microcapsule can be well integrated with organic solvent free fabrication of microcapsules, using double emulsion as template in microfluidic aqueous two phase system.

Keywords : phase change material, drug release kinetics, double emulsion, microfluidics
Conference Title : ICFMT 2015 : International Conference on Fluid Mechanics and Thermodynamics
Conference Location : New York, United States
Conference Dates : June 04-05, 2015