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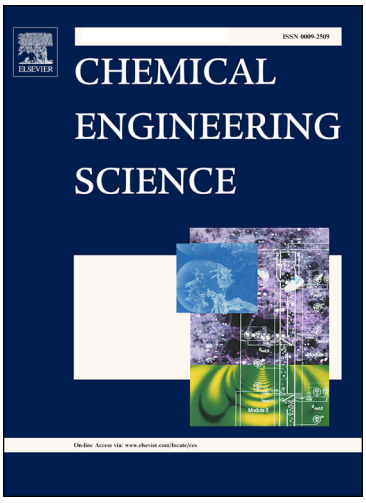

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Engineering polymeric Janus Particles for Drug Delivery using Microfluidic Solvent Dissolution Approach

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Keywords: Janus particles, dissolution kinetics, concentration gradients, drug delivery; droplets

Abstract

Here we present the microfluidic approach to engineer polymeric Janus particles using solvent dissolution for potential drug delivery applications. Unlike the polymerization based particle generation techniques, this method does not suffer from potential toxicity concerns for drug delivery. This technique is based on dissolving away the solvent in the solution droplets containing designed concentration distribution of drug and polymer while preserving the concentration distribution during the transition of the droplet into a particle. We investigated the kinetics of solidification and concentration evolution in the droplets under different operational conditions. Our investigation demonstrated that the designed biphasic concentration of a drug surrogate introduced into two hemispheres of the droplets can be preserved in solidified particles. We conclude with practical guidelines for generating polymeric Janus particles using the dissolution technique.

Introduction

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