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Fabrication of Solid and Core-Shell PVDF Microparticles via Electrospray

Abstract

Polymeric microparticles (MPs) have been investigated widely by several researchers due to their impact in tissue engineering, food industries, drug delivery and biosensing. Using the electrospray technique, which is a simple and very effective deposition process, can lead to the formation of controlled sizes and morphologies of the particles. To achieve this, the experimental parameters such as the polymer solvent interactions, flow rate, voltage, needle tip to collector distance and coaxial needles in the case of core-shell particle fabrication would have to be optimized. The polymer used in this work is Polyvinylidene fluoride (PVDF), a non-toxic and a semi crystalline polymer with at least four crystalline phases (α, β, γ, and δ), with the β-phase having the largest piezoelectric response.

We studied the influence of the fabrication parameters control on the diameter and uniformity of solid and core-shell PVDF microparticles. We also studied how post-processing techniques such as annealing affects properties of the microparticles. The structural and morphological characteristics of produced microparticles were observed using Raman Spectroscopy and Scanning Electron Microscopy.

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