

Preparation Non-Woven Nanofiber Structures for Uniform and Rapid Drug Releasing Applications Using an Electrospinning Process

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Abstract : Uniform and rapid drug release are important for trauma dressing application. Low glass transition polymer system and non-woven nanofiber structures as the designs conduct rapid-release characteristics. In this study, polyvinylpyrrolidone, polysulfone, and polystyrene were dissolved in dimethylformamide to form precursor solution. These solutions were blended with vitamin C to form the electrospinning solutions. The non-woven nanofibers structures were successfully prepared using an electrospinning process. The following instruments were used to analyze the characteristics of non-woven nanofibers structures: Atomic force microscopy (AFM), Field Emission Scanning Electron Microscope (FE-SEM), and X-ray Diffraction (XRD). The AFM was used to scan the nanofibers. 3D Graphics were applied to explore the surface morphology of nanofibers. FE-SEM was used to explore the morphology of non-woven structures. XRD was used to identify crystal structures in the non-woven structures. The evolution of morphology of non-woven structures was changed dramatically in different durations, because of the moisture absorption and decreasing glass transition temperature; the non-woven nanofiber structures can be applied to uniform and rapid drug release for trauma dressing application.

Keywords : nanofibers, non-woven, electrospinning process, rapid drug releasing

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