Integration of Synthetic and Biodegradable Polymers Through Needleless Electrospinning for Development of Heterogeneous Nanofiber Layers

Nitin Arjun Charhate

Research Student, UICT (University Institute of Chemical Technology) of Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalagon, Maharashtra, India

Dr. Tushar Dilip Deshpande

Associate Professor, UICT (University Institute of Chemical Technology) of Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalagon, Maharashtra, India

Abstract:

This study investigated the fabrication of various synthetic and biopolymeric nanofibers using a needleless electrospinning system. A range of synthetic polymers (polyamide, polyvinylidene fluoride, polyacrylonitrile, polyurethane, Poly vinyl alcohol) and biopolymers (chitosan, cellulose acetate, polyvinyl butyral, polycaprolactone), along with their mixtures, were electrospun using the needleless electrospinning technique. The resulting fiber surface morphology demonstrated that the wire electrospinning method is effective for large-scale production of heterogeneous nanofiber layers. Additionally, needleless electrospinning enhanced desirable properties, improved adhesion characteristics, increased productivity, and reduced the diameter of the nanofibers as compared to conventional systems.

Keywords:

Needle less Electrospinning, Synthetic Polymer, Biopolymer, Blend.