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Electrospun nanofibrous ZnO/PVA/PVP composite films for efficient antimicrobial face masks

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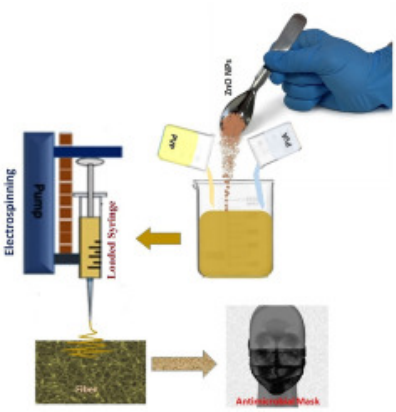
Abstract

Air pollution is a major concern for the global community due the environmental degradation and human health related issues. Along with vehicular gaseous discharges, there are microbial contaminants in our atmospheric air causing health problems. Different types of innovations have been carried to produce efficient face masks suitable to filter both particulate and microbial contaminants. In this paper, low cost and highly stable nanofibrous ZnO/PVA/PVP composite films created utilizing electrospinning technique, and their various properties, including antimicrobial activities are reported in the first time. Zinc Oxide (ZnO) nanoparticles dispersed homogeneously mixed PVA/PVP polymer blend solution was used in the electrospinng system to prepare ZnO/PVA/PVP composite nanofiber. The nanofiber properties have been investigated utilizing scanning electron microscope (SEM), Fourier transform infrared (FTIR) spectroscopy, Raman spectroscopy, UV–Visible spectroscopy and X-Ray Diffraction (XRD). Antimicrobial activity study conducted on the fibers showed good results, indicating the usefulness of the prepared nanofibrouse material for antimicrobial face masks.

Graphical abstract



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Keywords

Electrospinning; Polymers; Polymer nanocomposites; Face masks; Antimicrobial

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