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Electrospinning of Poly(vinyl) Alcohol Nanofibers containing Mesoporous Silica Nanoparticles

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Abstract. This study reports on the preparation of nanoparticles subsequently incorporated into the nanofibers. Nanofibers based on Poly(vinyl) alcohol (PVA) containing mesoporous silica nanoparticles (MSNs) were successfully prepared by the electrospinning method. MSNs were synthesized by co-condensation method with average particles size of ~70 nm. Ionic liquid of 1-hexadecylpyridinium bromide (C₁₆PyBr) was used as a template to prepare silica coated MSNs. The effect incorporation of MSNs into the polymer solution to form fibrous structure was studied. Two solvents were used to explore the effect of dispersion nanoparticles in nanofibers. The morphologies, diameter and structure of nanoparticles and electrospun nanofibers were evaluated by Transmission electron microscopy (TEM) and Field emission scanning electron microscope (FESEM). The results showed that MSNs have good dispersion in the PVA nanofibers by using acetone as a solvent, therefore this co-delivery system could be an effective carrier for controllable delivery of drug.

Keywords: poly(vinyl alcohol), mesoporous silica nanoparticles, nanofiber, electrospinning, morphology.