

## ELECTROSPUN POLYVINYL ALCOHOL-MILK NANOFIBERS

by

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*Milk is mixed with polyvinyl alcohol solution with water as solvent, and the mixed solution is used for fabrication of polyvinyl alcohol-milk nanofibers by the electrospinning.*

Key words: *polyvinyl alcohol, milk, nanofiber, electrospinning*

### Introduction

The outstanding biocompatibility of polyvinyl alcohol (PVA) and milk has extended their potential applications to tissue engineering and biology. Mahanta *et al.* [1] investigated hybrid nanofibers fabricated by PVA, milk protein, and inorganic salts, and the nanofiber sheet shows excellent cytocompatibility. In present research, the mixture of PVA with marketed milk is used as electrospun solution to produce nanoscale PVA-milk fibers.

### Experimental

Electrospinning process is a simple and efficient method to produce micro or nanofibers [2-4]. In this paper, the solution is a combination of PVA and milk. The preparation of the solution follows the steps below.

Two gram PVA particles with a degree of polymerization of  $1750 \pm 50$  are first mixed with 18 gram deionized water to form 10 wt.% PVA solution mixture at room temperature. The mixture is then stirred by magnetic stirring apparatus at 90 °C for 3 hours until a transparent and homogeneous solution is obtained.

After the preparation of the PVA solution, two gram marketed milk is added to the solution, which is then stirred by the magnetic stirrer at 90 °C for another 1 hour to make the mixed solution uniformly distributed. The final solution is then cooled down to the room temperature for future usage.

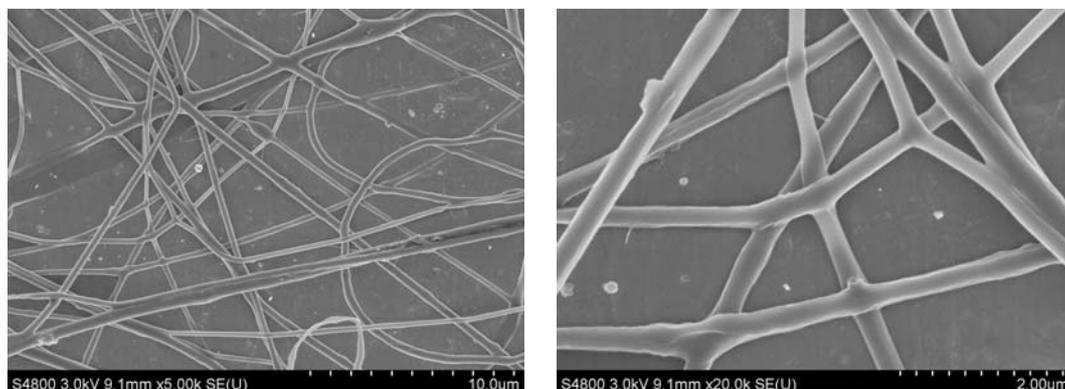
In the electrospinning experiment, the voltage is set as 30 kV, the distance between the needle and collector is 20 cm and the flow rate of the solution is set as 1 mL/h. The morphology of collected nanofibers is examined with scanning electron microscopy (SEM, S-4800, Hitachi, Tokyo, Japan) which is shown in fig. 1.

From fig. 1, we can see that the diameters of the PVA-milk nanofibers are about 300-400 nm, the surface of the fiber is comparatively smooth.

### Conclusions

In present research, the PVA-milk fibers are produced with traditional electrospinning technique. The SEM photos show that it is feasible to manufacture PVA-milk nanofi-

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**Figure 1. Morphology of the PVA-milk nanofibers under SEM**

bers. In future work, we will carry out both theoretical and experimental research to analyze the influence of different spinning parameters and solution properties on the PVA-milk nanofiber morphologies.

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