

## EFFECT OF DIRECTION OF BLOWING AIR ON MORPHOLOGY OF NANOFIBERS BY BUBBFIL SPINNING

by

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Short paper

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*Blowing air in bubbfil spinning process can be used to not only overcome the surface tension of polymer bubbles, but also pull the debris to form either nanofibers or yarns. This paper studies experimentally the direction of blowing air on the morphology of obtained nanofibers.*

*Key words: air injection, bubble electrospinning, surface morphology, nanofiber*

### Introduction

Acetate fiber as a white solid, which has flexible and transparent property, has many advantages in textile engineering, such as surface gloss, easy molding and thermoplastic processing. Bubbfil spinning is a simple and effective method to produce nanofibers using polymer solution or melt [1-6], cellulose acetate is used to replace the natural cellulose in the field of electrospinning, since it is easy to dissolve in organic solvents. In this research, hot air blowing device was installed near the receptor of bubbfil electrospinning to study effect of blowing direction on the spinning process.

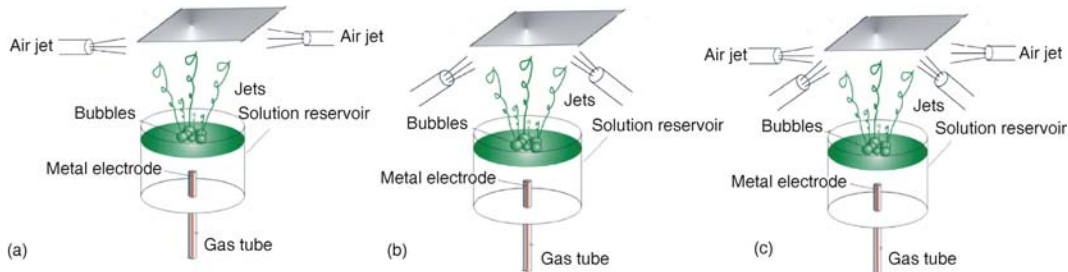
### Experiment

The volatile liquid dichloromethane and acetone was mixed into solvent with the volume ratio of 3:1, which dissolve the discarded acetate fiber into acetate cellulose solution with the concentration of 7.5%. Figure 1 is the experimental set-up showing the blowing direction.

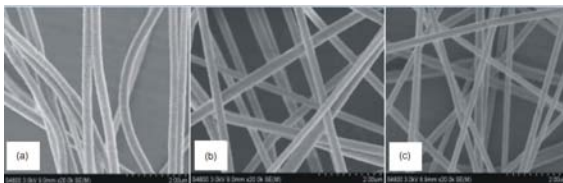
### Discussion and conclusion

It can be seen from fig. 2 and tab. 1 that the horizontal direction of blowing air can be used to fabricate parallel nanofibers, and the entry angle of blowing air can adjust effectively orientation of obtained nanofibers. A suitable choice of the entry angle can produce yarns consisted of multiple nanofibers.

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**Figure 1.** Direction of blowing air in bubbfil electrospinning; (a) horizontal direction, (b) direction with an entry angle, and (c) combination of (a) and (b)



**Figure 2.** The SEM of acetate nanofibers; (a), (b), and (c) correspond to, respectively, (a), (b), and (c) in fig. 1

**Table 1.** The number statistic of different directions

	Figure 2(a)	Figure 2(b)	Figure 2(c)
The number percentage of crossed nanofiber	5%	92%	49%
The number percentage of paralleled nanofiber	95%	8%	51%

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