

## Production of Nanofibers Using Electrospinning

### Enhanced Electrospinning Method via Ultrasonic Vibration and Heat to Produce Fine Fibers

Electrospinning is a production method that uses electric force to make fine fibers out of polymers or polymer solutions. Electrospinning allows for versatility, as fibers can be created with multiple arrangements. Unfortunately, there are limitations to current electrospinning methods. It is difficult for current methods to create mass quantities of fine fibers, so commercial applications may be limited. The use of complex, multi-needle nozzle designs hinders advances, as it is difficult to duplicate.

### The technology

A researcher at Virginia Commonwealth University (VCU) has developed an alternative electrospinning method that utilizes an ultrasonic nozzle alongside with ultrasonic vibrations and heat to produce mass quantities of fine fibers. When this method is applied, the ultrasonic vibration and heating reduce the voltage required for the spinning, and under the action of the ultrasonic vibration, gas bubbles are introduced into the spun solution without injection at the nozzle exit. With the presence of electrical field, multiple fibers are produced existing the surface through the nozzle. The simultaneously use of heated dry air and stacked ring plates eases fiber drying and harvesting. The result is an efficient method to create mass quantities of fine fibers.

### Benefits

- » Reduced surface tension
- » Needle-free nozzle design
- » High throughput

### Applications

- » Filtration products
- » Material Research
- » Various medical applications  
(biological scaffolds, patch drug delivery systems, etc.)

### Patent status:

Patent pending: U.S. and foreign rights are available.

### License status:

This technology is available for licensing to industry for further development and commercialization. **Prototypes have been developed and tested**

### Category:

Engineering and Physical Science

### VCU Tech #:

21-129

### Investigators:

[Daren Chen, Ph.D.](#)

### Contact us about this technology

Koffi Egbeto, MS  
Licensing Associate  
egbetok@vcu.edu  
(804) 827-2213