Tubular Collector Array for Centrifugal Spinning Equipment

Lead Inventor

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Research Interests

- Mesenchymal stem cell containing micro-tissues
- Musculoskeletal tissue regeneration
- Mechanical stresses and strains in vascular tissues

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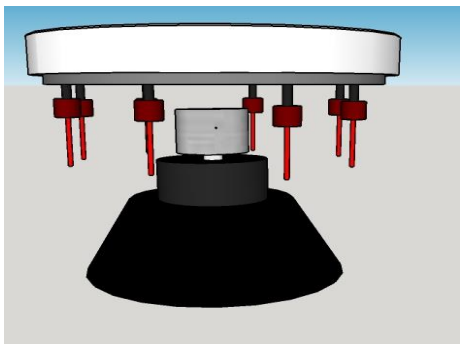
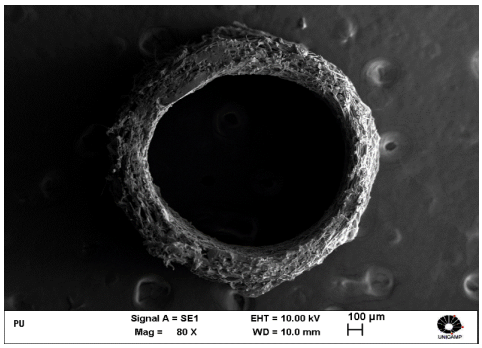
Overview

Force spinning fiber production provides a much more rapid method to produce micro- and nano-fibers. This invention provides a method to rapidly collect fibers onto an array of rotating spindles during fiber production to rapidly form tubular constructs. The invention also provides methods for exposing photocrosslinkable fiber materials to UV irradiation during spinning, thus eliminating the need for solvents.

Technology

The idea utilizes photocuring (photo-polymerization) to eliminate the need for solvents. By doing so, it enables these fibers to more easily be used for cell culture / tissue engineering constructs. Further, by using a rotating collection mandrel, this invention can rapidly produce these tubular nanofiber scaffolds. By controlling the rotation speed and size of the mandrel, one could control the fiber and scaffold diameter as well. Co-axial extrusion during spinning provides a method for producing dual component fibers.





Advantages

- Cost efficient and rapid production
- High porosity, single or dual component fibers
- Can control fiber and scaffold diameter
- Eliminate use of toxic solvents

Applications

- Medical: Tube-shaped tissues
- Textiles and filtration systems

Stage of Development

- Initial experiment yielded positive & repeatable results: a tube with circumferentially aligned fibers (1mm – 8mm diameter)

Patent Status

Patent Pending