"NOVEL METHOD FOR FORMING MICROSCOPIC POLYMER INTERCONNECTIONS" VCU #02-070

Applications

- Microchips and biochips
- Intrachip optical interconnections
- Microsensors
- Polymer nanowires

Advantages

- Microscopic and nanoscale polymer interconnections
- Electric-field driven process
- No chemical reactions necessary
- Allied to a wide variety of polymers

Inventors

Gary Tepper, Ph.D.
Royal Kessick, Ph.D.

Contact

Wendy M. Reid, Ph.D.
Licensing Associate
wmreid@vcu.edu
Direct 804-827-2213

Market Need

Polymer fibers form the basis of a wide variety of industries ranging from breathable, weather-resistant, and bullet-proof garments to telecommunications, structural engineering, and medicine. Polymer fibers are conventionally created by extruding a polymer melt through a spinneret and subsequently drawing the fibers as they coagulate. However, it is difficult to produce submicron diameter fibers using this conventional process and many emerging opportunities exist for high performance nanoscale materials and devices.

Technology Summary

This is a novel method that allows for the extension of polymer electrospinning to microscopic dimensions for the production of nanoscale polymer fibers, interconnections, and scaffolds on the surface of a microchip. The process is similar to conventional electrospinning, but is achieved on a micrscopic scale and utilizes significantly lower driving potentials. The fiber formation process is very simple and fast, does not require any special materials, chemistry, or equipment, and can potentially be applied to a wide variety of materials such as conducting, electroactive, photonic, and biocompatible polymers. This process can be used for numerous applications including; intrachip optical interconnections for the computer industry, chip-scale biocompatible fiber-based scaffolds, and highly sensitive microsensors.

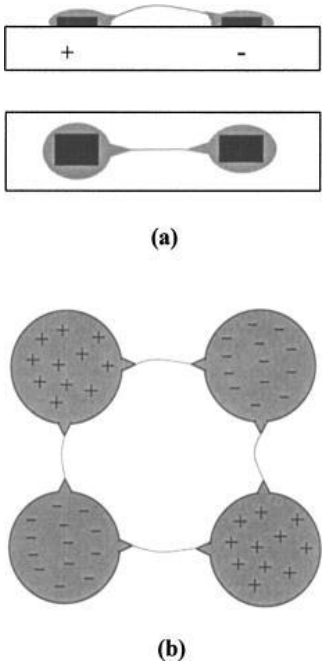

Fig. (a) Schematic diagram illustrating fiber formation between neutral droplets on oppositely charged electrodes. (b) Illustration of fiber formation between oppositely charged droplets applied to an insulating surface using electrospray ionization.

Technology Status

U.S. Patent 7,135,134

This technology is available for licensing to industry for further development and commercialization.