Researchers at the University of South Florida have designed a technique to fabricate coaxial arranged devices and nanostructures with the electrospinning technique from organic semi-conductive and conductive polymer.

Nanostructures with diameters ranging from 100nm to hundreds of micrometers can be formed. The core/shell structure, fabricated by electrospinning, has been used to fabricate micro tubes, drug delivery nanochannels, and devices for multifunctional applications. Owing to the increasing level of its application, there is need for a simplified production technique to serve the growing market.

With this in mind, USF inventors have developed a single step process of electrospinning a P-N junction of organic semi-conductive and conductive polymers for electrical devices that advance the current state of the art in organic semi-conductors.

This invention has the novelty of fabricating a core/shell nanofiber using organic semi-conductive and conductive polymers, which are critical in the fabrication of organic diodes, transistors, and sensors. The internal (core) nanofiber forms a direct junction with the shell generating a p-n junction (a diode). The internal core also can be inclusive of two or more organic semi-conducting fibers having the composition of blended or distinct polymers.

This innovative structure is promising for new advancements for organic diodes, field effect transistors (FET’s), sensors, biosensors, bioarrays and organic solar cell structures, needing to capitalize on high surface area.