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## Emerging electrospun lignin fibers: Carbonization and characterization

Manjusri Misra, Vida Poursorkhabi and Amar K Mohanty  
University of Guelph, Canada

Lignin, a natural polymer synthesized by plants, has been studied as a renewable, low-cost, and highly available precursor for production of nano to a few micro diameter carbonized fibers. Annually, about 40 to 50 million tons of lignin is produced as the byproduct of paper and cellulosic ethanol industries and it is the mostly non-commercialized residue. In this research, electrospinning of lignin followed by carbonization of the fibers have been studied. Carbonization was performed by following a two stage process, i.e., thermal stabilization in air followed by carbonization in nitrogen atmosphere. The effects of lignin type, binder polymer type and carbonization conditions on the properties of carbonized fibers were studied. The properties of interest include morphology studies by scanning electron microscopy and atomic force microscopy, carbon structure studies by Raman and X-ray diffraction spectroscopy, surface area measurements, thermal and electrical conductivities of the carbonized material.

### Biography

Manjusri Misra is a Professor in the School of Engineering and holds a joint appointment in the Dept. of Plant Agriculture at the University of Guelph. Her current research focuses primarily on novel bio-based composites and nanocomposites from agricultural and forestry resources for the sustainable bio-economy targeting the development of bio-based and eco-friendly alternatives to the existing petroleum-based products. She has authored more than 380 publications, including more than 250 peer-reviewed journal papers, 25 book chapters and 15 granted patents. She was an Editor of the CRC Press volume, "Natural Fibers, Biopolymers and Biocomposites," Taylor & Francis Group, Boca Raton, FL (2005); American Scientific Publishers volume "Packaging Nanotechnology", Valencia, California, (2009) and "Polymer Nanocomposites", Springer (2014). She was the Chief Editor of "Biocomposites: Design and Mechanical Performance" Woodhead Publishing (in press June 2015). She was the 2009 President of the Bio Environmental Polymer Society (BEPS). She is one of the Associate Editors of the journal "Advanced Science Letters". In 2012, she received the prestigious "Jim Hammer Memorial Award" in Texas, USA from the Bio Environmental Polymer Society. Her current research is primarily focused on novel bio-based polymers, fibres and composite materials from agricultural and forestry resources for the sustainable bio-economy and application of nanotechnology in materials uses.

[mmisra@uoguelph.ca](mailto:mmisra@uoguelph.ca)

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