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Magnetic and electronic materials in optical fibers

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The integration of semiconductor and metal structures into optical fibers has created a paradigm shift in the development of the next generation of optoelectronics. Although fiber optic sensing platforms stand to benefit from the pursuit of all-fiber optoelectronics, little attention has been paid to taking advantage of this opportunity. Furthermore, the success of all-optoelectronics will eventually hinge on the availability of fibers containing materials that will conduct and manipulate electrical signals. In this talk, the author will discuss the results of research attempting to address this need by fabricating magnetic and electronic fibers with a traditional fused silica cladding. Fibers with copper and silver cores were fabricated via melt-draw technique on a customized fiber drawing system. The potential for "all-fiber-fiber optic sensing" was also investigated via the fabrication of fibers with Metglas[®] and Terfenol-D cores. Fibers with barium titanate cores were fabricated to demonstrate the prospective for increased "all-fiber functionality". Composition and microstructure analysis was performed to evaluate material and process capability. This work provides the foundation for further development of all-fiber optoelectronic fibers, devices and sensors.

Biography

Daniel Homa completed his PhD in Ceramic and Materials Science and Engineering from Rutgers University. He is a Senior Research Associate under Dr. Gary Pickrell at Virginia Tech. He has 16 patents issued, an additional 14 patent pending, and 10 papers published in reputed journals.

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