

Enhanced Silicon Optical Fiber (2011-061)

Silicon optical fibers for use in infrared applications

Market Overview

Optical fibers are used in a wide range of industries as a conduit to transmit light. Fibers comprising silicon offer a marriage of fiber optics with silicon photonics and opens the door to numerous opportunities in chemical sensing, thermal imaging, and related applications where infrared light is used.

Technical Summary

The Clemson technology is a type of optical fibers that incorporates an oxide glass cladding and crystalline silicon core. Oxide impurities that have been inadvertently introduced into the fiber core during drawing are eliminated by a chemical reaction from a scavenger prior to drawing resulting in lower loss and greater crystalline perfection.

Application

Medical applications: Imaging and remote sensing
Defense and security: Infrared light sources and thermal imaging

Development Stage

Technology is mature

Advantages

- New fabrication method results in a fiber that combines lower losses with smaller cores, making the technology suitable for infrared nonlinear optics
- Provides greater transparency and efficiencies compared to current semiconductor technology due to the use of scavengers to eliminate the oxide scattering centers
- Resulting fibers are mechanically strong and are fabricated using well-established silicon manufacturing processes, which reduces costs while increasing yield

App Type	Country	Serial No.	Patent No.	CURF Ref. No.	Inventors
Non-Provisional	United States	NA	9,069,117 Related IP: 8,934,748	2011-061	Dr. John Ballato Dr. Robert Rice



About the Inventors

Dr. John Ballato

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John Ballato is a professor of materials science and engineering at Clemson University (Clemson, SC USA) where he holds the Sistine Endowed Chair of Optical Fiber. A Fellow of the OSA, IEEE, AAAS, SPIE, and ACerS, Ballato has over 425 publications, 35 US and foreign patents, and is an elected member of the World Academy of Ceramics (limited to < 300 members world-wide) and the US National Academy of Inventors (NAI). His collaborative work on Anderson localizing optical fiber was selected as one of the Top Ten Breakthroughs of 2014 by Physics World (Institute of Physics, IoP).

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