NEWS | DECEMBER 17 2018

Molten core optical fiber fabrication: A versatile, simple and practical approach for producing long lengths of novel material fibers FREE

Zhengzheng Zhang

Scilight 2018, 510014 (2018)
https://doi.org/10.1063/1.5086209

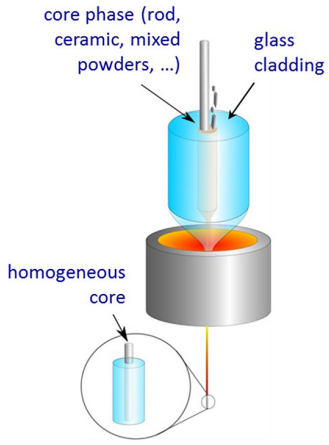
Scilight

21 December 2018

Molten core optical fiber fabrication: A versatile, simple and practical approach for producing long lengths of novel material fibers

Zhengzheng Zhang

The history, materials, challenges and promises of the molten core method, a flexible and versatile method for fabricating long-length novel optical fibers.



Optical fibers are the backbone of digital information transmission around the world and critical components in devices used for environmental sensing, telecommunications, modern surgery and manufacturing. Although nowadays most commercial fibers are made from silica glass, present and future demands call for higher-performance or more advanced optical fibers with novel core materials. Accordingly, this requires new fiber fabrication approaches not only in the preform fabrication but also in the drawing procedures.

A new perspective on a straightforward, low-cost, versatile fiber fabrication method called the molten core method (MCM) reviews the history, range of the accessed materials and key technical innovations of the MCM. The perspective also discusses future opportunities for the method as well as key challenges, such as loss reduction and interconnection with the conventional fibers and optoelectronic circuits.

In the MCM, a precursor core phase is placed into a cladding glass tube and melts at the temperature that the cladding glass draws into fiber. This melt, which may chemically interact with the cladding, solidifies into a desired core phase as the glass fiber cools.

First introduced in 1993, the MCM has proven to be a versatile, low-cost and practical method over the years for producing a wide variety of novel multicomponent all-glass optical fibers and practical crystalline core semiconductor optical fibers. Possible applications fall under a wide range of areas such as high-power fiber laser development, all-in-fiber optoelectronic system, surgical probes and terahertz waveguides for security measures.

Source: "Perspective: Molten core optical fiber fabrication—A route to new materials and applications," by J. Ballato and A. C. Peacock, *APL Photonic* (2018). The article can be accessed at https://doi.org/10.1063/1.5067337.