Semiconductor Optical Fibers for Nonlinear Photonics

A. C. Peacock, H. Ren, N. Healy and A. F. J. Runge
Optoelectronics Research Centre, University of Southampton, Southampton, SO17 1BJ, U. K

The nascent field of semiconductor optical fibers is attracting increasing interest as a means to exploit the optoelectronic functionality of the semiconductor materials directly within the fiber geometry [1]. Compared to their planar counterparts, this new class of waveguide retains many of the advantageous properties of the fiber platforms such as robustness, flexibility, and long waveguide lengths. Furthermore, by employing standard fiber post-processing procedures to reshape and recrystallize the core material, it is also possible to tailor the optical properties beyond what is achievable on-chip, of particular use for nonlinear applications [2]. In this paper we review our efforts regarding the nonlinear characterization of a range of semiconductor fibers. Results of transmission measurements obtained for fibers with different core materials and geometries will be presented and the potential to extend their application into the mid-infrared wavelength regimes discussed.

[1] A. Peacock et al., Laser Photonics Rev. **8**, 53 (2014)
[2] F.Suhailin et al., Opt. Lett. **41**, 1360 (2016)