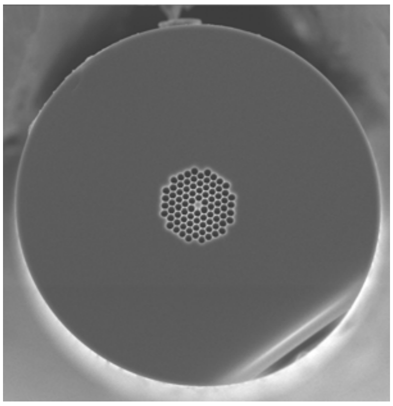
Photonic Crystal Fibers by

CRYSTAL FIBRE

NL-2.8-850-02

Highly nonlinear PCF



Nonlinearity: 47 $W^{-1} km^{-1}$
Zero dispersion λ=850nm
Single material
Spliceable

Our highly nonlinear photonic crystal fibers guide light in a small solid silica core, surrounded by a microstructured cladding formed by a periodic arrangement of air holes in silica. The optical properties of the core closely resemble those of a rod of glass suspended in air, resulting in strong confinement of the light and, correspondingly, a large nonlinear coefficient. By selecting the appropriate core diameter, the zero-dispersion wavelength can be chosen over a wide range in the visible and near infrared spectrum, making these fibers particularly suited to supercontinuum generation with Ti:Sapphire or diode-pumped Nd^{3+}-laser sources.

Unique properties of Highly nonlinear PCF

- Zero dispersion wavelengths from 670-880 nm available
- Nonlinear coefficients up to 190 $W^{-1}km^{-1}$ available (cf 1.1 $W^{-1}km^{-1}$ for SMF 28 at 1550 nm)
- Near-Gaussian mode profile

Applications

- Supercontinuum generation for frequency metrology, spectroscopy or optical coherence tomography
- Four-wave mixing and self-phase modulation for switching, pulse-forming and wavelength conversion applications
- Raman amplification

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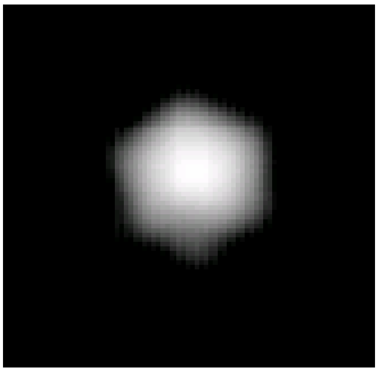

Typical measured near field profile (log scale)

Optical properties

- Zero dispersion wavelength (λ_0) — 850±5 nm
- Dispersion slope at λ_0 — 0.48 $ps \cdot nm^{-2} \cdot km^{-1}$
- Attenuation

λ_0	<	10 dB/km
1550 nm	<	6 dB/km
1380 nm	<	40 dB/km
1000 nm	<	10 dB/km
600 nm	<	17 dB/km

- Mode field diameter[1] at λ_0 — 1.9±0.1 µm
- Numerical aperture[2] at λ_0 — 0.38
- Effective nonlinear area[3] — 4.0 μm^2
- Nonlinear coefficient[4] at λ_0 — 47 $W^{-1} \cdot km^{-1}$

Physical properties

- Core diameter (average) — 2.8±0.1µm
- Pitch (distance between cladding holes) — 2.7 µm
- Air Filling Fraction in the holey region — >88%
- Width of struts holding the core — 160 nm
- Diameter of holey region — 28 µm
- Diameter of outer silica cladding (OD) — 136 µm
- Coating diameter (single layer acrylate) — 220 µm
- Available length — up to 1 km

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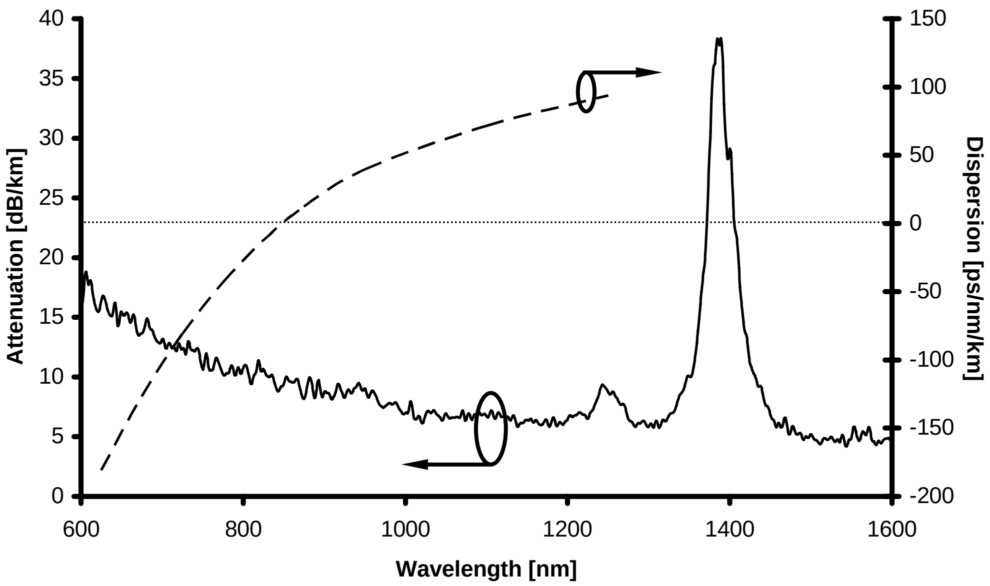
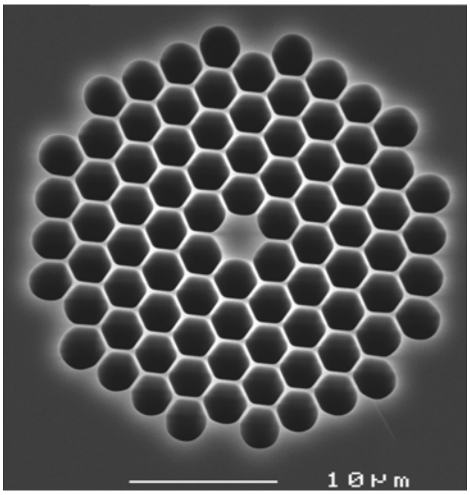
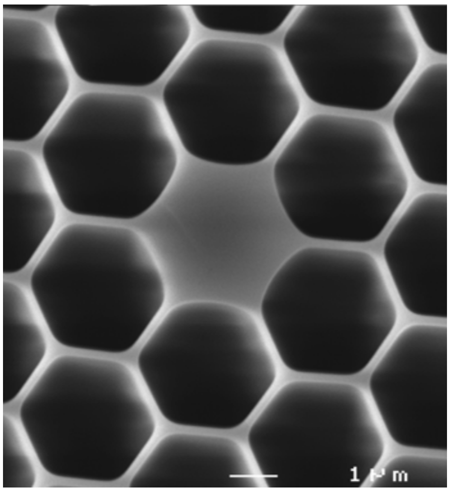
Typical attenuation spectrum and chromatic dispersion



SEM image of PCF region and core





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Notes

1 Full 1/e-width of the near field intensity distribution

2 Sine of half angle at which a Gaussian fit to the far field intensity distribution has dropped to 1% of its peak value

3 $$A_{eff} = \frac{\left(\int_{\infty} |\mathbf{E}(\mathbf{r})|^2 d^2\mathbf{r} \right)^2}{\int_{silica} |\mathbf{E}(\mathbf{r})|^4 d^2\mathbf{r}}$$

4 $$\gamma = \frac{2\pi n_2}{A_{eff}\lambda}$$

$n_2 \approx 2.5 \times 10^{-20}$ m^2 W^{-1} for silica