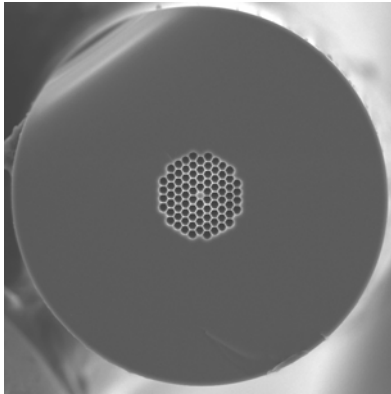


NL-3.0-870-02



Highly nonlinear PCF

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 Nd³⁺-laser sources.

Nonlinearity: 42 W⁻¹ km⁻¹

Zero dispersion $\lambda=870$ nm

Single material

Spliceable

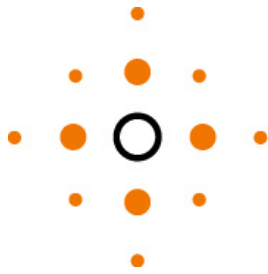
Unique properties of Highly nonlinear PCF

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

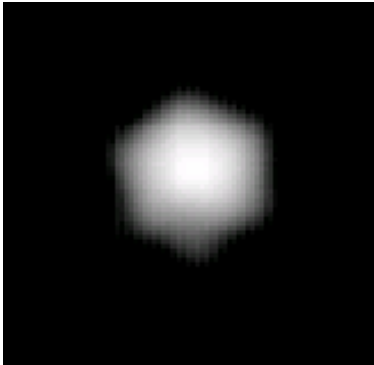
Applications

- 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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CRYSTAL FIBRE



Typical measured near field profile (log scale)

Optical properties

- Zero dispersion wavelength (λ_0) 870±5 nm
- Dispersion slope at λ_0 0.44 ps·nm⁻²·km⁻¹
- Attenuation

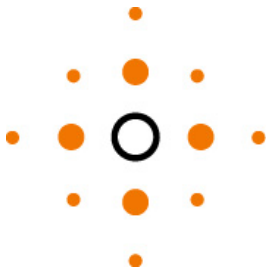
λ_0	<	10 dB/km
1550 nm	<	6 dB/km
1380 nm	<	40 dB/km
1000 nm	<	10 dB/km
600 nm	<	17 dB/km
- Mode field diameter¹ at λ_0 1.9±0.1 μ m
- Numerical aperture² at λ_0 0.34
- Effective nonlinear area³ 4.3 μ m²
- Nonlinear coefficient⁴ at λ_0 42 W⁻¹·km⁻¹

Physical properties

- Core diameter (average) 2.95±0.1 μ m
- Pitch (distance between cladding holes) 3.15 μ m
- Air Filling Fraction in the holey region >89%
- Width of struts holding the core 150 nm
- Diameter of holey region 32 μ m
- Diameter of outer silica cladding (OD) 144 μ m
- Coating diameter (single layer acrylate) 220 μ m
- Available length up to 1 km

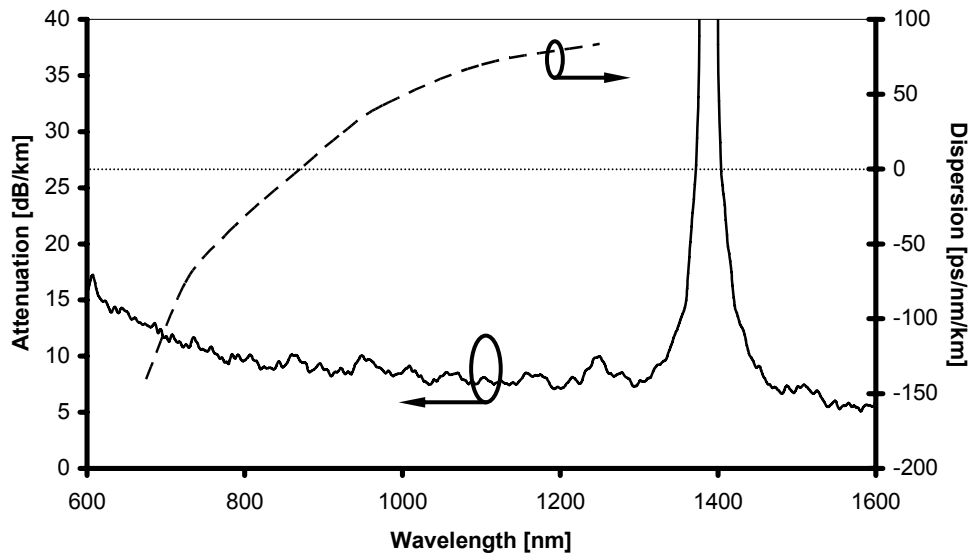
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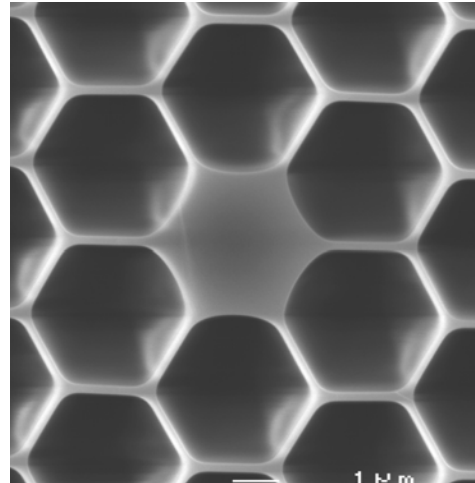
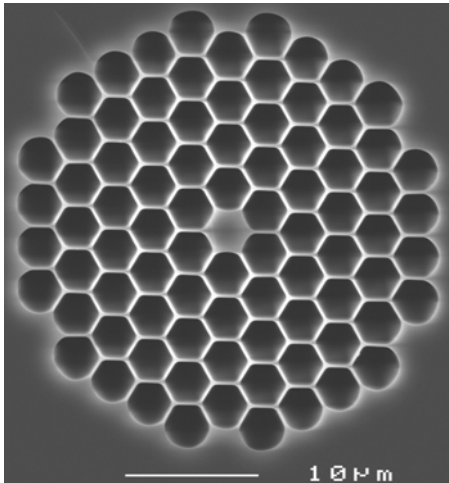


CRYSTAL FIBRE

Typical attenuation spectrum and chromatic dispersion



SEM image of PCF region and core



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CRYSTAL FIBRE

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

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

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

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