

Polycrystalline Mid-InfraRed Fiber

art photonics has developed a volume production technology of a unique product - Core / Clad Polycrystalline Infra-Red (PIR-) fibers transparent over a broad spectral range 3 - 17 μm . Highest performance PIR core/clad fibers are extruded with core diameters span from 240 μm to 860 μm . Continuously improved extrusion process provides a superior optical quality and mechanical strength of PIR- fibers. Low optical losses without absorption peaks over the mentioned spectral range ensure a successful use of PIR- fiber for a broad range of applications.

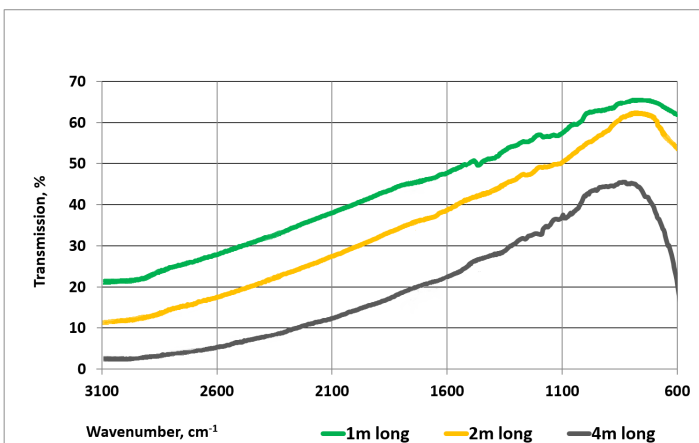


Applications:

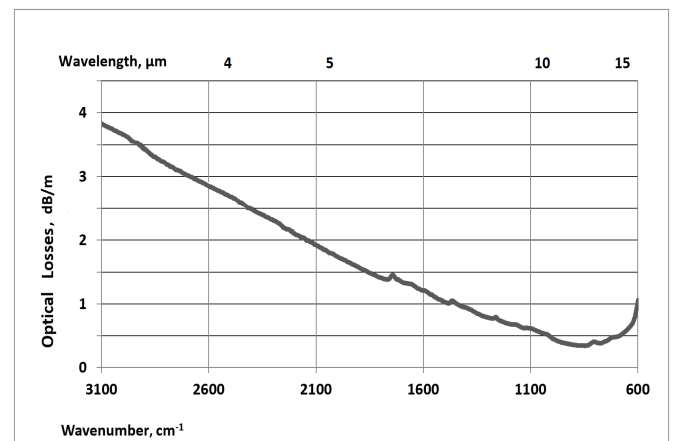
- ✓ Mid IR spectroscopy
- ✓ Flexible IR pyrometry
- ✓ Flexible IR-Imaging systems
- ✓ Power delivery for Quantum Cascade Lasers
- ✓ Power delivery for CO and CO₂ Lasers

Features:

- ✓ High transmittance in 3-17 μm range
- ✓ Low optical losses 0.2 – 0.3 dB/m in 9-13 μm range
- ✓ Core/Clad structure with core diameters span from 240 to 860 μm
- ✓ Minimal aging effect
- ✓ Non-hydroscopic and non-toxic



Transmission Spectra of Polycrystalline Fibers of Different Length (Spectral Quality Grade)



Optical Losses Spectrum of Polycrystalline Fiber

Working Range

UV

VIS

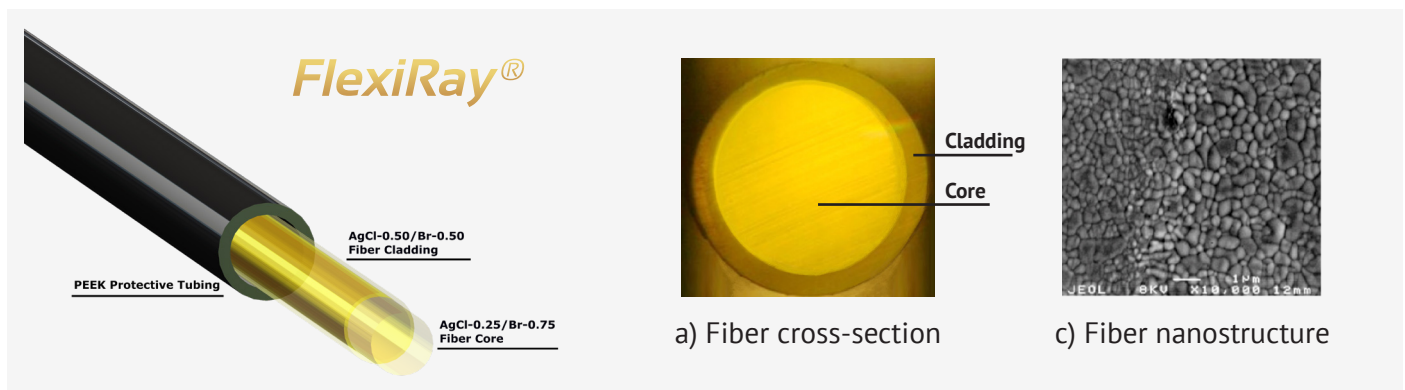
NIR

MIR

3-17 μm

Specifications

| | |
|---|---------------------------------|
| Core/Cladding Composition | AgCl : AgBr |
| Spectral Range | 3 - 17 μm |
| Core Refractive Index | 2.15 |
| Fresnel Reflection Losses | 25% |
| Attenuation at 10.6 μm | 0.2 - 0.4 dB/m |
| Effective Numerical Aperture NA | 0.30 +/- 0.03 |
| Melting Point | 410 $^{\circ}\text{C}$ |
| Operating Temperature | -273 to +140 $^{\circ}\text{C}$ |
| Core/Clad Diameter (standard) | see table below |
| Laser Damage Threshold for CW CO ₂ laser | >12 kW/cm ² |
| Tensile Strength | > 70 MPa |
| Minimum Bending Radius (fixed) | 5 [Fiber Diameter] |
| Minimum Elastic Bending Radius | 150 [Fiber Diameter] |



Parameters of standard Polycrystalline fibers

| Code | Type | Core, μm | Cladding, μm | Protective Jacket, μm | NA** | Min. bending Radius, mm |
|-------------|----------------------|---------------------|-------------------------|----------------------------------|-----------------|-------------------------|
| PIR240/300 | Step Index Multimode | 240 \pm 15 | 300+0/-15 | no | 0.30 \pm 0.03 | 45 |
| PIR400/500 | Step Index Multimode | 410 \pm 15 | 500+0/-15 | no | 0.30 \pm 0.03 | 75 |
| PIR600/700 | Step Index Multimode | 600 \pm 20 | 700+0/-15 | no | 0.30 \pm 0.03 | 100 |
| PIR900/1000 | Step Index Multimode | 860 \pm 20 | 1000+0/-25 | no | 0.30 \pm 0.03 | 150 |

** effective value