

# 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  $\mu\text{m}$ . Highest performance PIR core/clad fibers are extruded with core diameters span from 240 $\mu\text{m}$  to 860 $\mu\text{m}$ . 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.

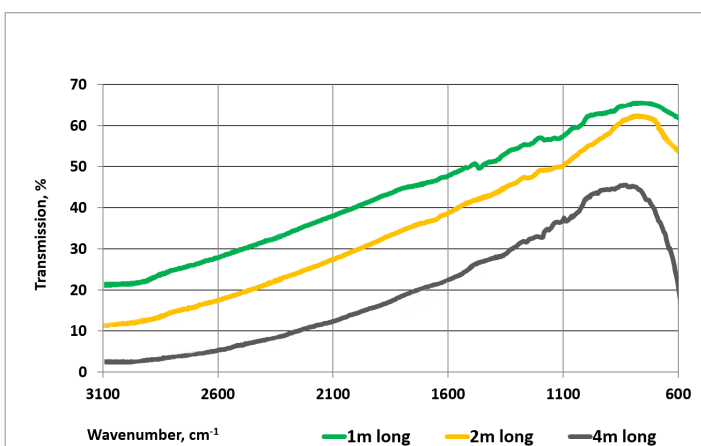


## Applications:

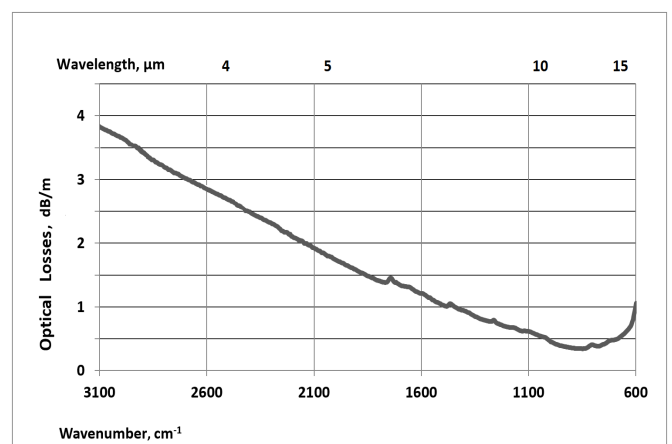
- ✓ Mid IR spectroscopy
- ✓ Flexible IR pyrometry
- ✓ Flexible IR-Imaging systems
- ✓ Power delivery for Quantum Cascade Lasers
- ✓ Power delivery for CO and CO<sub>2</sub> Lasers

## Features:

- ✓ High transmittance in 3-17  $\mu\text{m}$  range
- ✓ Low optical losses 0.2 – 0.3 dB/m in 9-13 $\mu\text{m}$  range
- ✓ Core/Clad structure with core diameters span from 240 to 860  $\mu\text{m}$
- ✓ 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

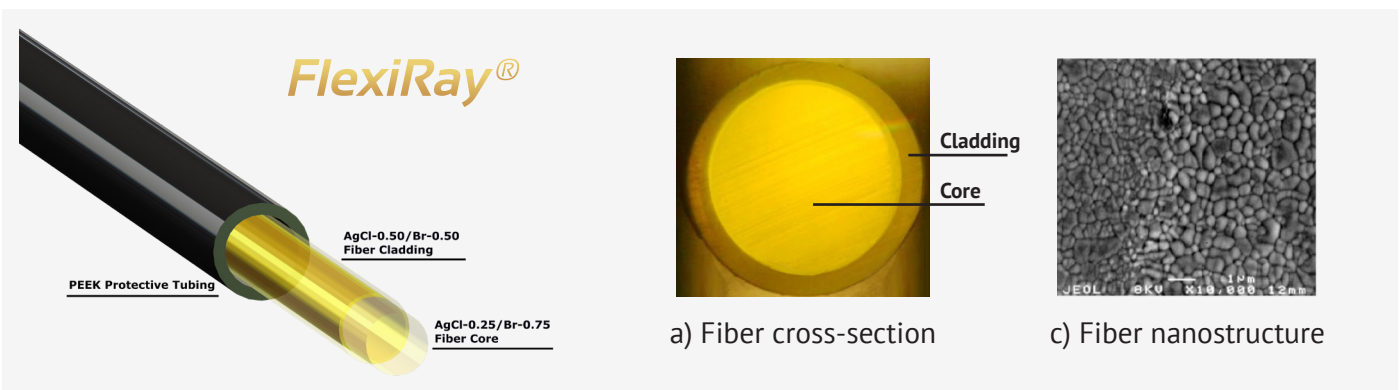
NIR

Mid-IR

3-17  $\mu\text{m}$

## Specifications

Core/Cladding Composition	AgCl : AgBr
Spectral Range	3 - 17 $\mu\text{m}$
Core Refractive Index	2.15
Fresnel Reflection Losses	25%
Attenuation at 10.6 $\mu\text{m}$	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 <sub>2</sub> laser	>12 kW/cm <sup>2</sup>
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, $\mu\text{m}$	Cladding, $\mu\text{m}$	Protective Jacket, $\mu\text{m}$	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