

LOW PHOTODARKENING OPTICAL FIBERS

INO is a world-class center of expertise in industrial applications for optics and photonics. As a leading technology developer and provider, INO is home to the largest concentration of skills in the field in Canada and is one of the world's leading suppliers of specialty fibers.

WHAT WE OFFER

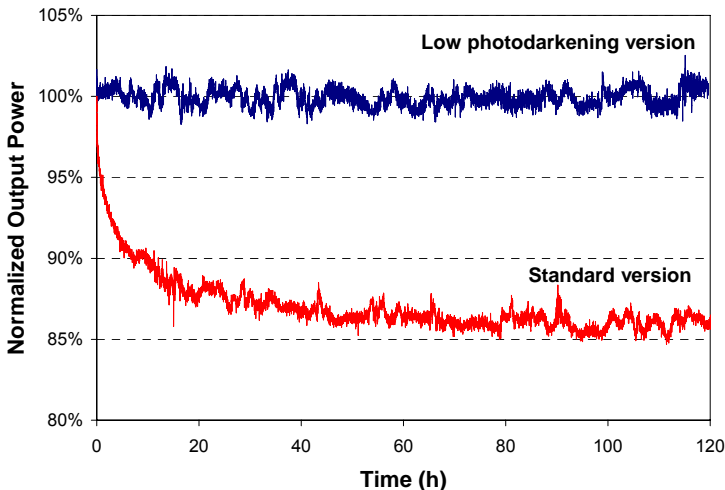
We provide custom optical fibers with low photodarkening to meet your specific fiber laser requirements. Thanks to our expertise in chemistry, we successfully optimized the chemical composition of our fibers for low photodarkening. Our technology applied to single-clad, double-clad and triple-clad designs.

ADVANTAGES OF THE Yb:P/Al/Si glass matrix

- = High level of power stability
- = Increased fiber lifetime
- = Excellent control of the fiber refractive index profile
- = High laser efficiency

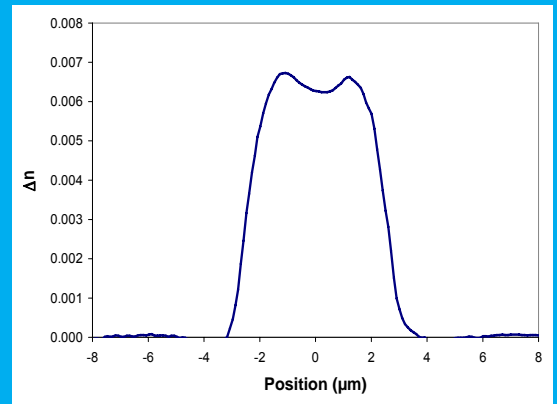
CHARACTERIZATION EXAMPLE

Comparison of low photodarkening (Yb:P/Al/Si) and standard (Yb:Al/Si) fibers

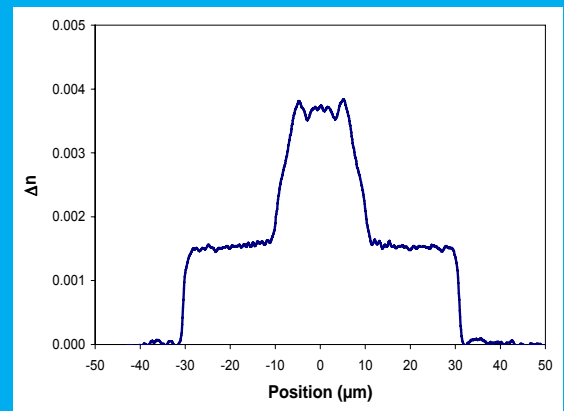


Yb-doped single-clad fiber amplifiers, 40-mW cw output power, 1064 nm

REFRACTIVE INDEX PROFILE EXAMPLES



Yb-doped single-mode, single clad fiber and standard (Yb:P/Al/Si) fibers

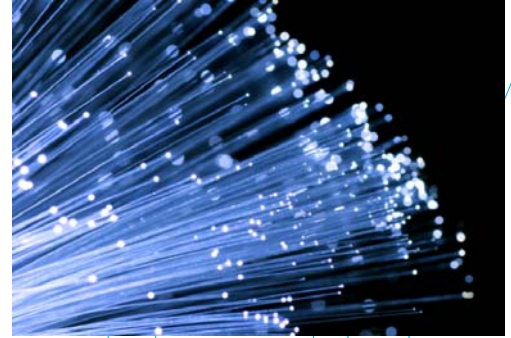


Yb-doped LMA triple-clad fiber



CHALLENGING LIGHT
FOR OUR PARTNERS

CHARACTERIZATION AND SIMULATION OF PHOTODARKENING IN OPTICAL FIBERS



Photodarkening is a well-known problem for optical fibers, reducing their lifetime. At INO, we have developed modeling tools for faster, more precise characterization of your fibers in response to your specific needs.

EXPERTISE

Modeling and prototyping of

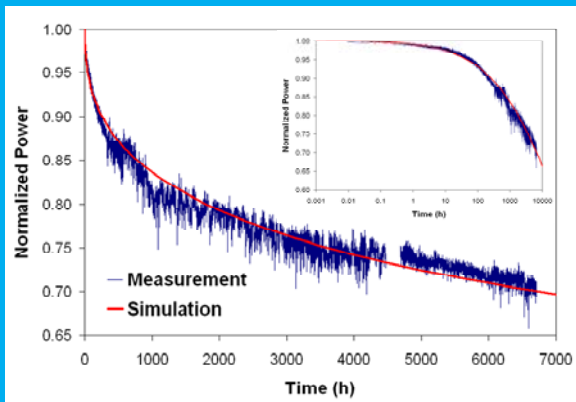
- = Rare-earth doped LMA and single-clad fiber amplifiers and lasers
- = Fiber laser systems (CW, ns, ps, and fs)

TACKLING PHOTODEGRADATION

- = Characterization of the photodarkening properties of optical fibers
 - . Maximum excess loss
 - . Rare-earth population inversion-dependent photodarkening rate
- = Simulation of long-term, time-dependent output power
- = Prediction of fiber lifetime for given operating conditions
- = Assistance in system design by determining how to operate fibers to achieve desired performances with an acceptable photodegradation

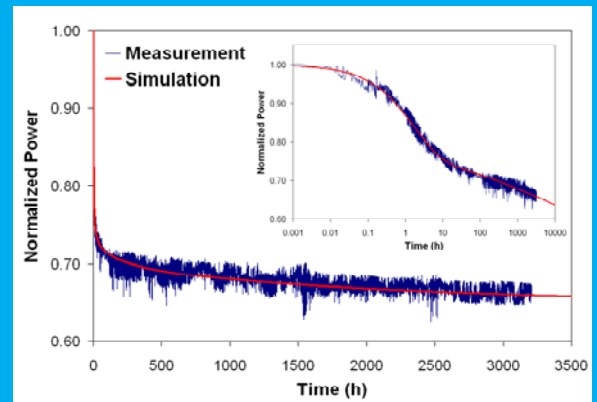
CHARACTERIZATION EXAMPLES

Long-term characterization and simulation of photodegradation in a pulsed regime



Pulsed Yb-doped LMA fiber amplifier
1-kW peak power, 10 ns, 100 kHz, 1064 nm
(6 dB/m max excess loss @ 1064 nm)

Long-term characterization and simulation of photodegradation in a cw regime



Yb-doped single-clad fiber amplifier
60-mW cw output power, 1064 nm
(1.6 dB/m max. excess loss @ 1064 nm)