Newsletter 1/2005 May 4, 2005

www.liekki.com

Contents of this issue

- Liekki Application Designer v2.0 - providing greatly enhanced features
- Liekki Direct Nanoparticle Deposition (DND) process - benefits and advantages
- Liekki's photodarkening findings on DND fibers

Events calendar

- **CLEO'05, Baltimore**, Maryland, May 22 - 27
- **Photonics China2005**, Shanghai, May 30 - June 1
- **LASER2005, Münich**, June 13 - 16. Booth B2.460
- **InterOpto, Tokyo**, July 13 - 15
- **CIOE, Shenzhen**, China, September 6 - 9
- **ECOC'05, Glasgow**, September 26 - 28
- **NanoSolutions2005, Cologne,** November 8 - 10 - Liekki's CEO Dr. Per Stenius invited guest speaker.

View Events calendar

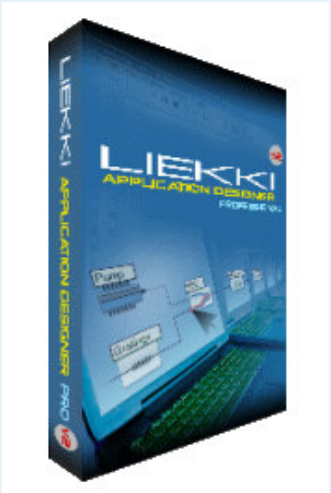
Introduction

We are proud to introduce the first Liekki Newsletter edition covering the latest news and developments on our products and solutions. Our goal is to make this newsletter quick and easy to read; and most importantly, informative and useful to you. The Liekki Newsletter will be published every other month and cover important topics with links to the Liekki website providing more detailed information about each topic.

Liekki is focused on leveraging innovative nanoparticle materials and processes to manufacture the highest performance active fibers. We supply fibers, fiber subassemblies (optical engines) and simulation software for demanding fiber applications, such as those in the industrial, military, aerospace, medical and communications sectors.

We hope that you will find the information in this newsletter useful and we would greatly appreciate your comments and feedback on the content to improve the quality of future newsletters. Our next issue in early July will introduce the next version of Liekki Application Designer (version 3.0), Liekki highly efficient PM fiber with a large mode area and the newly developed Liekki Optical Engines.

Sincerely,
Bill Willson
Vice President, Marketing and Sales



Liekki Application Designer v2.0 - providing greatly enhanced features

Liekki Application Designer is starting to gain popularity, now serving more than 40 companies and laboratories around the world. Its second version provides unique features for a commercial simulator of its class: high power ytterbium doped and double cladding fibers, Monte Carlo analysis (including manufacturing yield analysis), distributed computing and user defined active component.

Recently Liekki opened its web based user community where you can be in touch with the latest development, interact with Liekki's experts or simply browse for information. Visit www.liekki.com/community. In addition you may find Liekki Application Designer active and passive component files as well as Liekki Application Designer sample project files by visiting www.liekki.com/lad.

Stay tuned for more simulation power - Liekki Application Designer v3.0 is due to be launched in July 2005. It will bring a new dimension: time and new functionality: non-linear effects as well as an even easier to use look and feel!

Request more information | Back to top

Liekki Direct Nanoparticle Deposition (DND) process - benefits and advantages

DND is the first new fiber deposition process industrialized in the last two decades. While DND for fiber production has been in development since 1999, it is still early in the technology S-curve and much capability remains to be exploited. Conventional processes include MCVD, OVD or VAD. These methods use gases or high vapor pressure precursors in the deposition. Adding rare earth elements and co-dopants in the glass is difficult since there are not stable high vapor pressure precursors for these materials. As a result, these rare earth elements are added through solution doping. Solution doping causes a number of limitations including, limited control and level of doping and refractive index profile (RIP) homogeneity due to its inherent diffusion process. In general, solution doping is also a very slow process, particularly for large mode area fibers.

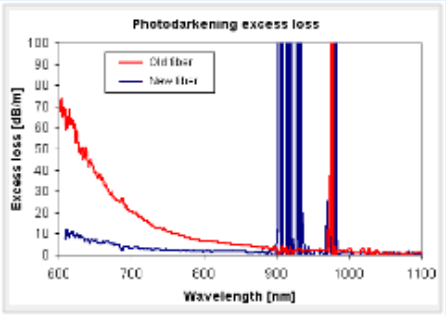
The broad objective of Liekki has been to develop a process that gives high gain and flat gain profile in a short length of fiber. As the name implies DND deposits nanoparticles (5-100nm depending on deposition parameters) directly onto a mandrel in the preform process. All precursors and rare earth elements are brought from liquid phase directly to the reaction zone. Rare earth elements are added as part of the glass particle formation in such a way that clustering is extremely low.

Benefits of DND include:

- Highest doping concentrations in the industry
- Ability to add all elements in deposition (silica, index, rare earth)
- Ability to efficiently do large core/clad ratio fibers
- Very accurate control of doping profile
- Ability to control doping radially
- Ability to maintain a very flat refractive index profile (RIP)
- High threshold to photodarkening

Read more about Direct Nanoparticle Deposition (DND) Technology

Request more information | Back to top



Click to enlarge image

Liekki's photodarkening findings on DND fibers

We recently issued the following press release:
Liekki offers highly doped nanoparticle fibers with greatly reduced photodarkening

Photodarkening is an impairment in doped fibers that manifests itself as increased attenuation over time. In extreme cases, under certain pump conditions, photodarkening results in considerable incremental attenuation over a timeframe of minutes. This severely limits the efficiency and lifetime of fiber lasers and fiber amplifiers. Photodarkening is known to exist in fibers doped with Yb^{3+}, Tm^{3+}, Ce^{3+}, Pr^{3+} and Eu^{2+}. Recently Liekki and the industry have been focused on photodarkening in ytterbium (Yb^{3+}) doped fibers for industrial and military lasers. The underlying mechanism of photodarkening is not completely understood, and there are several factors that contribute to it. It is believed that the formulation of the core composition, inhomogeneities and impurities, the co-dopants used in conventional fiber processes and unwanted rare earth dopants are key factors to photodarkening. In our white paper "Photodarkening: Understanding and Mitigating" we report some recent learnings and insights developed into photodarkening.

Liekki has developed a new generation of Direct Nanoparticle Deposition (DND) doped ytterbium fibers with a significant improvement in

photodarkening performance. As importantly, Liekki DND fibers, in a side-by-side testing comparison, showed much less photodarkening degradation than fibers manufactured with standard fiber processing technique (MCVD).

Read more in the white paper "Photodarkening: Understanding and Mitigating".

Request more information | Back to top

Contact Liekki

! Some links may not function properly in Lotus Notes.