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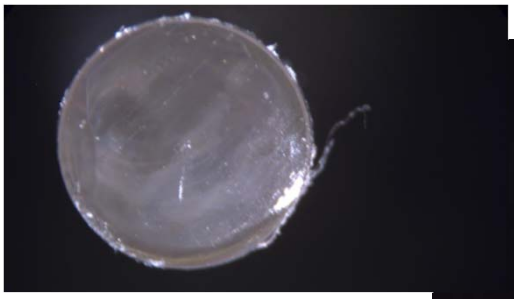
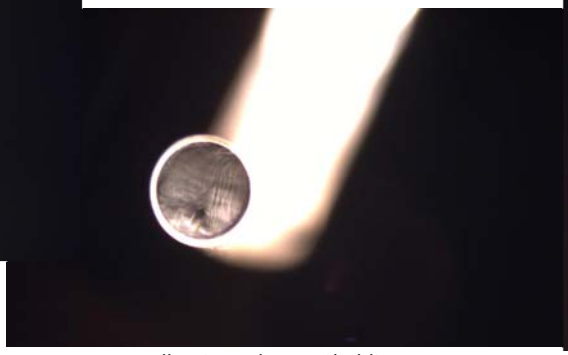
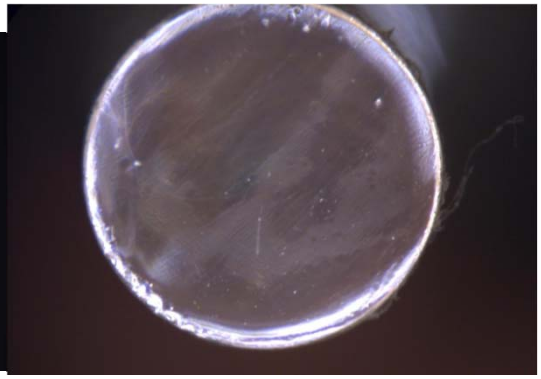


Initial Attempt at Laser Polished Surface



Illuminated PTFE Cladding



One of the Multiple Laser Cut/Polished Surfaces

Single Step Cutting and Polishing of Acrylic Optical Fibers Using a CO_2 Laser

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Abstract

Optical fibers are widely used in modern communications and provide improvements in data transmission characteristics (distance, bandwidth, etc.) compared to other approaches such as metal wires. Optical fibers are also used for illumination and can transmit intense light (lasers) or images (when wrapped in bundles), which has led to numerous other applications, including high resolution sensors.

Our objective was to develop a time saving and suitable alternative to mechanical cutting and polishing thousands of acrylic optical fibers. Illustrated here is the development of a one-step operation to simultaneously cut and polish hundreds of 2 mm, PTFE-clad acrylic (PMMA) fiber optic cables using a 100 W CO_2 laser. Cables were mounted in fiber transportation racks for ease of processing and for efficiency.

Conclusion

The simultaneous cutting and polishing of 100+ PTFE clad acrylic (PMMA) fiber optic cables was performed using a 100 W CO_2 laser. Cables were mounted in fiber transportation racks and the laser processing was optimized by adjusting the power output, air assist settings, laser speed, and image density.

Laser Cutting/Polishing Table

Laser Cutting/Polishing-In Process

Fiber Transportation Racks

U.S. DEPARTMENT OF ENERGY

NNSA National Nuclear Security Administration

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