Sealing the DC-200/40-PZ-Yb

V1.0 May 2011

This application note describes how to seal the DC-200/40-PZ-Yb fiber by collaps and cleave using a Vytran GPX 3400 splicer and a Vytran LCD-200 cleaver.

Process description

Splice to handle

A glass rod is spliced to the DC-200/40-PZ-Yb which has roughly the same OD as the fiber (450 µm). This is used rather than a coated fiber for two reasons. a) Coating removal of the handle is avoided. b) Uncoated fiber is less likely to slip in the LDC cleaver and a better control of the cleave point is achieved. If you do not have a glass rod available, it should be possible to use a coated fiber as well.

Both the DC-200/40-PZ-Yb and handle are cleaved in an LDC-200 cleaver. This is done to ensure low cleave angles. The splice parameters are listed below.

Collapse of holes

To ensure a good collapse and a strong splice joint that does not break during cleaving the splice is reheated in the GPX-3400. The parameters of the collapse are listed below.

If the collapse is poor the process is repeated, this time with an offset of ~-300 µm (If the fiber is placed in the left fiber holding block).

A poor collapse could be due to either of the following:

a) The collapsed holes have a large angle, i.e. the collapse line is not perpendicular to the length direction of the fiber.

b) Some of the holes are not collapsed.

c) The outside of the fiber over the collapsed region is not straight but has a kind of “trumpet” shape. This appears if the “hot push” in the splice is too large. It could also appear if a bubble is present in the splice joint, which can be caused by contamination on the fiber ends before the splice or by trapped air in the splice interface (sometimes the case when the cleave angles are large).

Cleaving through the collapsed region

This is done on the Vytran LDC-200 cleaver. The glass rod is placed in the right fiber holding block of the cleaver and The DC-200/40-PZ-Yb in the left holding block. As mentioned this is because the glass rod is less likely to slip. Since the right fiber holding block is fixed during the cleave, this means that the cleave position is better controlled. By looking through a microscope the collapsed region is carefully positioned 50-100 µm from the cleave position. Also it should be noted that the DC-200/40-PZ-Yb features Coil Control. This means that the fiber has polished sides and therefore a noncircular outer glass structure. The best cleaves with the lowest angle are achieved if the cleave blade hits the rounded side of the fiber. When the collapsed region and the rotation of the fiber are correctly set the clamps of the cleaver are closed and the cleave blade is engaged.

Process parameters

GPX-3400 Filament type

The filament that we use is a graphite V4 filament (GF-1.5-2.0-0.75-V4-16).

Ramp settings

To avoid thermally shocking the graphite filament, the ramp feature of the GPX-3400 should be enabled. This turns on and turns off the filament gradually. The following ramp features are used for the graphite V4 filament:

Ramp hold power = 80%
Up delay = 200 ms
Hold delay = 1000 ms
Down delay = 50 ms

Splice parameters

Gap = 15 µm
Pre push = 0 µm
Hot push = 100 µm
Push vel. = 100 µm/sec
Hot push delay = 1 s
Argon flow = 0.2 L/min
Offset = 0 µm
On duration = 1.5 s
Power = 120 W

Note: The gap value is used only for alignment. Before the splice is made the fibers are pushed together, such that they are touching each other. This minimizes the risk of the fibers slipping and thereby being misaligned after the splice. For splicing, the "Splice only" button in the FFS3 software is used. This should not make any further alignment, but only move the camera out of the way and perform the splice.

Collapse parameters

Gap = 0 µm
Pre push = 0 µm
Hot push = 0 µm
Push vel. = 100 µm/sec (Not used since there is no push)
Hot push delay = 0.5 s
Argon flow = 0.2 L/min
Offset = 0 µm
On duration = 3.5 s
Power = 120 W