Cleaving Procedure

Cutting capillary tubing and optical fiber can be accomplished by a number of methods. Matching the cutting method quality to the application requirements is essential and should be given due consideration. Cleaving is a quick, simple method that can yield a high quality end finish and works well for many applications.

The goal of any cleaving tool is to penetrate through the polyimide and impart a sub-micron defect into the outer glass surface. Ceramic cleaving stones and diamond tip devices are common and effective tools for imparting the required defect. Once a defect is generated, applying a linear tension to the defect separates the capillary or optical fiber. This is the preferred method and leads to the highest quality end faces. The most common error in cleaving is to bend the capillary or fiber, which normally yields a low quality cleave with an uneven and sometimes jagged end finish.

A general misconception when dealing with capillary tubing is that cleaving and breakage are unrelated. A poor cleave generates excessive glass debris inside of the capillary which can lead to internal flaws and subsequent breakage. It is not uncommon for this debris to be swept down the capillary by gases or liquids that are introduced, leading to flaws and breakage some distance down the capillary from the cleave itself. This effect is most common in large ID capillary, but can happen in any capillary product.

When dealing with optical fiber, a subsequent lap and polish is commonly employed to provide a final end finish with optimal transmission properties. Alternately, laser cutting of optical fiber and capillary tubing has proven to be a reliable method for many applications that require a flaw free end face.

The following general procedure should be followed when cleaving capillary tubing and optical fiber with a Polymicro ceramic cleaving stone.

Procedure:

1. Place the capillary tubing or optical fiber on a clean, flat surface. If possible, apply slight linear tension.
2. Holding the cleaving stone at approximately 30° angle to the tubing or fiber, draw the non-serrated edge of the cleaving stone across the tubing or fiber. Apply just enough pressure to penetrate through the polyimide coating.
3. Pull the tubing or fiber axially until it breaks. If it won't break, the polyimide coating has not been fully penetrated. Repeat the above steps, pressing down with slightly more force while drawing the cleaving stone across the tubing or fiber.
4. Once cleaved, inspect the end finish to ensure the cleave quality meets the application requirements.

Note: If end finish is not of concern, the tubing or fiber can be bent as opposed to pulling axially. The tubing will break more easily, but the end finish will be of lesser quality and excessive debris may be generated.

Useful Tip: It is not uncommon for users to practice the above cleaving procedure in order to become familiar with proper technique.