



BrightLine® Fluorescence Filters Don't Burn Out!

Are your filters over five years old? If so, they are likely soft-coated filters that degrade over time, vastly reducing your fluorescence image quality.

All Semrock filters are proven to be [exceptionally durable and environmentally reliable](#), even in hot and high-humidity conditions, and are capable of withstanding high optical intensities. Semrock filters either have [laser damage threshold \(LDT\) specifications](#), or, depending on the application, have been tested with intense broadband sources for extended periods of time with no noticeable degradation. **Semrock filters do not burn out under normal conditions**, even after prolonged use.

Optical fluorescence filters have traditionally been manufactured with older soft-coating technology. In fact, while many established manufacturers of fluorescence filters are starting to introduce hard-coated technology, soft-coated filters continue to be manufactured to this day and still represent the vast majority of fluorescence filters in the field. By contrast, all Semrock filters are "hard coated" – manufactured in high volumes with sophisticated Ion Beam Sputtering (IBS) technology – resulting in patented state-of-the-art filters with extremely durable hard glass coatings on a single hard glass substrate. No absorbing glass and no lamination are necessary. The result is exceptionally durable "no burn out" fluorescence filters of the highest performance.

Semrock's hard-coated filters have been tested to demonstrate their resistance to optical damage as compared to those of leading competitors' soft-coated and absorbing glass filters. The photographs below demonstrate how a conventional DAPI excitation filter burns out, whereas the Semrock excitation filter made with proprietary hard-coating technology is not affected by intense light sources, such as the mercury, xenon, and metal-halide lamps used in modern fluorescence imaging systems. In this test two filters were exposed to 8 W/cm² (for 1 day), and then subsequently to 1 W/cm² of continuous intensity (including ultraviolet through infrared wavelengths) from a Xe arc lamp for extended periods of time. The "competitor" filter – a UV excitation filter for the common fluorophore DAPI – rapidly showed signs of degradation, and in fact developed a severe crack after less than two weeks of exposure. On the other hand, Semrock's hard-coated DAPI excitation filter showed no noticeable signs of degradation even after 1000 hours of continuous exposure.

Competitor Premium DAPI Exciter Filter

Semrock Hard-coated DAPI Exciter Filter

After < 300 Hours Exposure

After > 1000 Hours Exposure

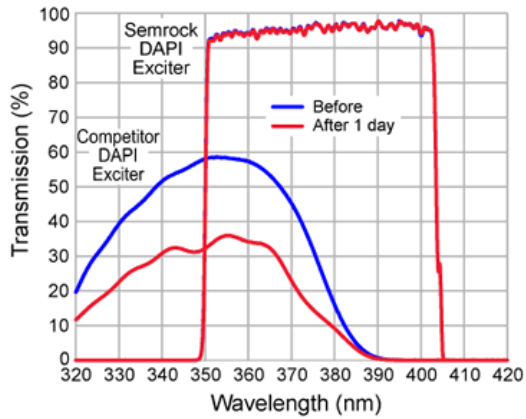
Degraded!

No change.

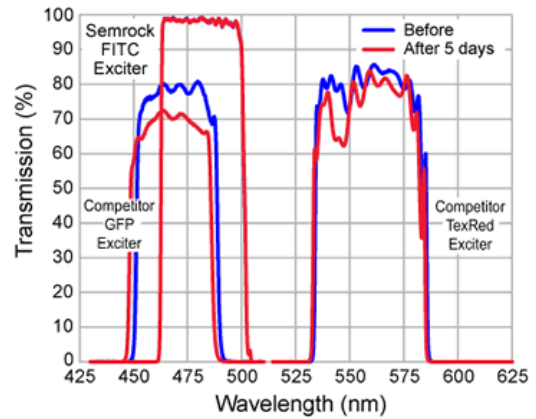


The graph on the lower left shows how burn-out of the competitor's DAPI exciter filter can severely affect the filter transmission, even after one day of exposure to 8 W/cm² – here the transmission has dropped by 42%! By contrast, the Semrock DAPI exciter is unchanged.

The graph on the lower right shows that leading competitor's soft-coated filters for visible wavelengths also show significant degradation after optical exposure, even at the intensity levels typical of most fluorescence microscopes. The transmission of these filters drops, and the spectra shift in wavelength. As always, the Semrock hard-coated filter shows no change.



Transmission spectra of DAPI exciter before (blue) and after (red) exposure to 8 W/cm² (over 15 mm diameter) for 1 day.



Transmission spectra of soft-coated exciter (for GFP and Texas Red) compared to a Semrock hard-coated exciter (for FITC) before (blue) and after (red) exposure to 1 W/cm² (over 25 mm diameter) for 5 days.