

TECHNICAL NOTE



SPI Supplies
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SPI Die-Cut Carbon Conductive Double Sided Adhesive Discs

Introduction

The SPI double sided adhesive carbon filled conductive discs combine both high purity and an almost coverglass smoothness to the sticky surface. In addition, the die-cut discs bring a high level of convenience to the SEM user who can order discs of the precise size needed for their respective SEM mounts. Furthermore, one will never see a static charge on the discs which makes for easy mounting of dry powders. Nothing could be easier to use than the SPI conductive double sided adhesive carbon discs.

For those doing AFM, non-conductive discs might be the preferred adhesive mounting system.

The original SPI Supplies

Brand® Discs

Originally developed for the SEM user, in sheet and tape form, SPI started to receive requests for these products not just as die-cut discs for SEM, but also for very large discs for other applications, such as settled dust studies in clean rooms, environmental studies involving the outdoor collection of fly ash and other particulates, including pollen and other air borne dusts. We are sometimes asked about the temperature range of use. We would be reluctant to recommend use above 130° C (266° F) outside the SEM or use within the SEM over 100°C. After heating, the adhesive will have lost its "tac" for

holding something new but anything already being held should retain at least some of its original adhesive strength. Above 140° C, the adhesive will start to decompose and convert to a carbonized residue.



Figure 1: Double sided adhesive carbon discs,
12 mm diameter

For use at low temperatures, the adhesive bond should maintain its basic properties at least to -20°C (-4° F) and depending on the stress being put on the bond, it would be much lower in temperature as well. And a large number of users report that they use the carbon sheets in particular, for the mounting of samples for surface analysis.

A few words about purities and out-gassing

These are the two most important questions in the back of the mind of anyone contemplating the use of the SPI double-sided carbon discs in their work. Over the years, we have, without fan-

fare, continually improved the disc, sheet and tape products, so that today, we can safely say that we are not aware of anyone who has been able to detect, by EDS, anything coming from the adhesive material itself. We are aware that at times, it has been reported that low levels of Si (coming from a release agent) can be detected by XPS. The discs are considered "UHV compatible" and there are no solvents or other volatiles that would come off the high vacuum of one of today's modern systems. It is because of the high purity of the SPI products that there is no discussion about trace elements that might be detected in an EDS system as is the case for similar appearing products offered by competitors.

The SPI Supplies UltraSmooth™ Double Sided Adhesive Conductive Carbon Discs

The biggest challenge for us at SPI over the years was to not only offer our customers discs with the purity approaching spectrographic purity (e. g. with a "clean" EDS spectrum), but the discs also had to be low enough in resistivity and also, it had to be reasonably beam stable and not decompose in the beam. UltraSmooth discs offer surface smoothness, but unfortunately, they are not high purity so one never knows for sure if an unexpected peak is due to their sample or from the disc being used. We do not recommend the SPI Supplies UltraSmooth discs for EDS use.

While our regular (original) discs are quite smooth and meet the requirements of most of our customers, there are some who still prefer something smoother. And now we have it for them.

Suggested storage conditions

For short term storage, that is, less than a year or so, room temperature storage is just fine. But if you have stockpiled a quantity, or have

purchased a large amount to take advantage of quantity pricing, we would suggest storing the excess under refrigeration. These are organic materials and at room temperature can, under certain circumstances, start to lose some of their "tac". This is true of either type of disc, either the "original" products or the newer UltraSmooth™ carbon disc products.

Removal of adhesive from SEM mount

Both types of carbon discs offered by SPI Supplies develop a surprisingly strong adhesive bond with the SEM mount surface and neither is removed that easily. For the standard original product, soaking in ethyl alcohol or isopropanol will help loosen the bond for a much easier removal but one should still be prepared to use a little "elbow grease" to get the mounts clean enough so that they can be reused.

For the ultrasmooth discs, we have found that acetone will eventually dissolve the adhesive and polymer backing, though it may take some time for it to fully dissolve.

Some Specifications

Resistivity: < 5 ohms/5 mm²
Adhesive family: Acrylic
Thickness: 0.16 mm

Revised by: E. Rodek

Date: 01/31/2024

