

SAMPLE PREP

Preparing Particles on Fusion E-chips™

Preparing nano and micro-sized particles on E-chips is usually straightforward. Particles are often suspended in liquids such as water or ethanol, or are in dry powder form. Particles suspended in solution can be deposited on the E-chip by drop casting a few microliters of suspension directly onto the membrane with a pipette. A small amount of dry powder can be sprinkled directly onto the membrane as well. The excess should be removed by holding the E-chip vertical with tweezers and gently tapping the end of your tweezers or your wrist/finger so loose, excess material falls off.

IMPORTANT CONSIDERATION

Excessive sample on the membrane may act as a heat sink, which degrades heating performance and can cause the E-chip thermal calibration to be inaccurate. Some trial and error may be needed to get the right amount.

Deposition from a liquid particle suspension can be completed in a few simple steps:

1. Dilute the particle suspension enough that a sufficient number of particles can be found on the membrane. Sonication may help break up agglomerated particles.
2. Using a pipette or eyedropper, take a small amount of suspension (ideally only a few micro liters) out of the bottle or vial. Put a droplet of the suspension on the E-chip (see figure on the right). Place the droplet just next to the membrane and allow the liquid to spread over it. The liquid may go over the entire E-chip, but this is generally not a problem if the copper/beryllium contact pins are cleaned regularly. See the Fusion user guide for instructions on how to clean these pins.

Note: *Be careful not to touch the membrane with the tip of the pipette or eyedropper as this can break the membrane. A broken membrane results in a broken heating element. If an E-chip has a broken membrane it should be replaced with a new E-chip.*

Note: *It can be helpful to hold the E-chip with a pair of tweezers during drop casting to ensure that it is not pulled into the pipette or eyedropper.*

3. Using a Kim-wipe or sanitary tissue to gently blot excess liquid. This is done by carefully touching a corner of the tissue to the liquid. The liquid will wick into the tissues.
4. Allow the liquid to dry. Drying can be accelerated by gently blowing nitrogen or clean air over the E-chip, by placing it in a vacuum chamber, or under a heat lamp.

Note: *All Thermal E-chips have a perforated membrane and some have a thin carbon film also with perforations. Particles can agglomerate at the edges of these perforations, which makes it difficult to find good areas for imaging. If the particles agglomerate excessively at the edges of the perforations, it may be necessary to dilute the suspension further.*

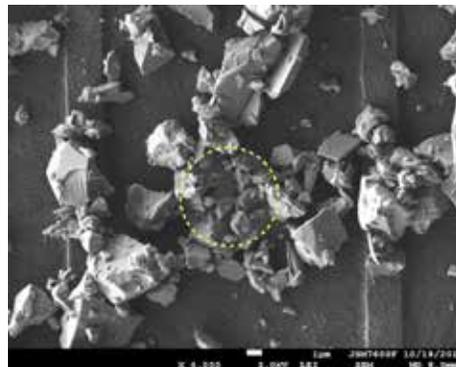


Figure 1: An SEM image of Schott glass particles on a Thermal E-chip. The particle size represents the largest recommended. Particles should be around 10 μm or less in diameter. The amount of loading should also not exceed what is shown here. The hole in the membrane is indicated by the yellow circle (7 μm in diameter).