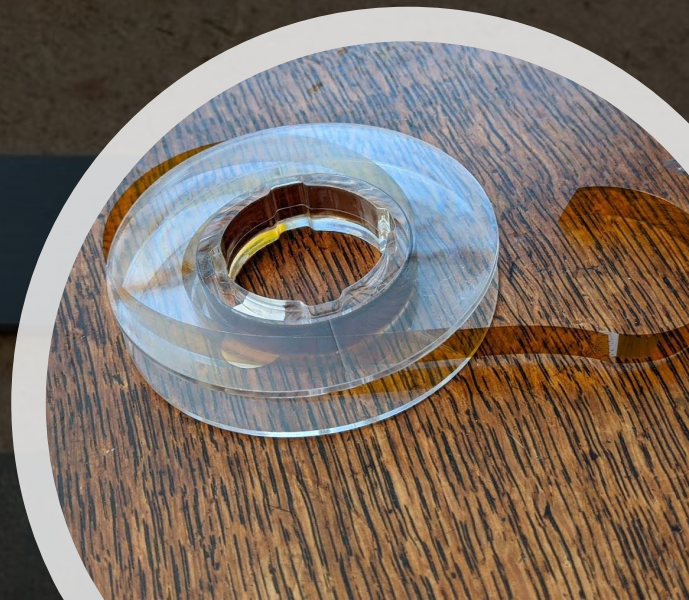
Array tomography

Items for toolkit

- Tweezers for handling the sample
  - Include some ultra-fine tip tweezers.
- PVA glue to coat one edge of the sample
- Carbon adhesive tape/tabs
- Tape for collecting sections (e.g. carbon coated Kapton tape)
- Large stubs, silicon wafer or other substrate (eg: ITO-coated coverslips)
- Eye lash brush
- Trimming knife (glass or diamond) or blade

Additional Items

- Diamond knife for sectioning (oscillation optional)
- Fine jewellers saw for rough trimming
- Bench mounted vice
- Silver paint



SBFSEM

Items for toolkit

- Tweezers for handling the sample including
  - ultra-fine tip tweezers
  - sample pin tweezers
- Sample pins
- Conductive epoxy glue
- Trimming knife (glass or diamond) or blade
- Blue tack (optional for supporting the sample)
- Parafilm (optional for supporting the sample)
- PVA glue to coat one edge of the sample (optional)

Additional Items

- Fine jewellers saw for rough trimming
- Bench mounted vice

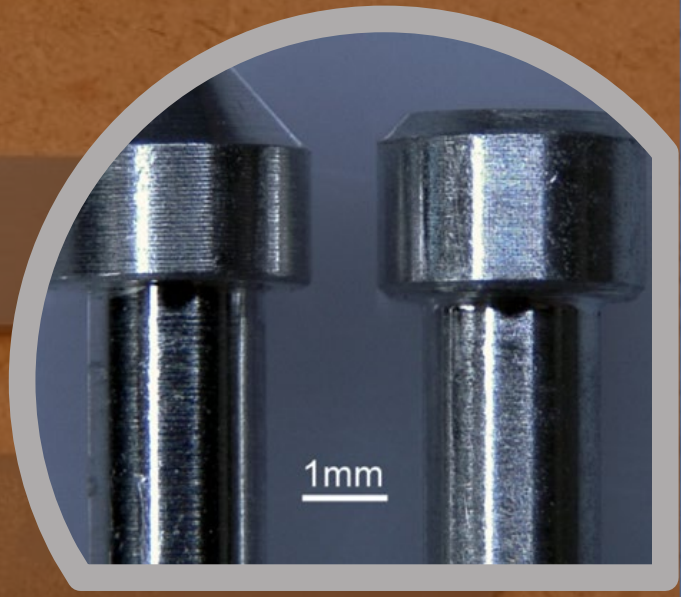
FIBSEM

Items for toolkit

- Tweezers for handling the sample including
  - ultra-fine tip tweezers
  - sample pin/stub tweezers
- Sample pins/stubs/tilted stubs
- Conductive epoxy glue
- Trimming knife (glass or diamond) or blade
- Blue tack (optional for supporting the sample)
- Parafilm (optional for supporting the sample)
- PVA glue to coat one edge of the sample (optional)

Additional Items

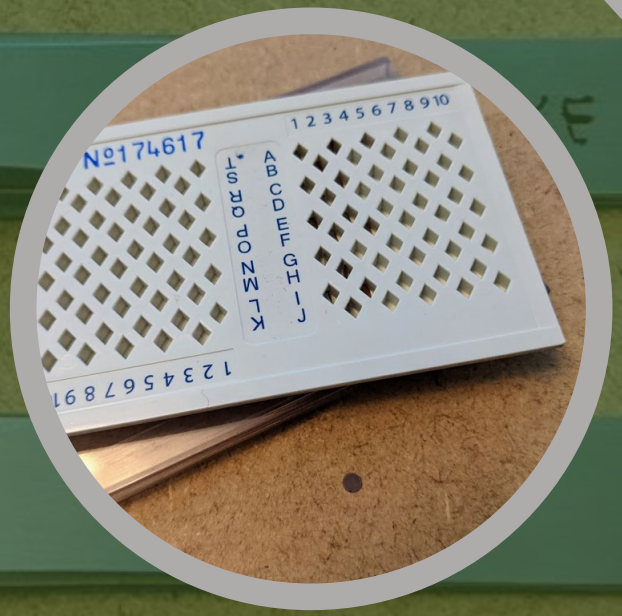
- Fine jewellers saw for rough trimming
- Bench mounted vice



Electron tomography

Items for toolkit

- Appropriate grids for your application (large mesh or slot recommended)
- Ultrafine tweezers for handling the sample and grids
- Eyelash brush
- Grid box
- Parafilm/grid staining tray
- Blades for trimming resin



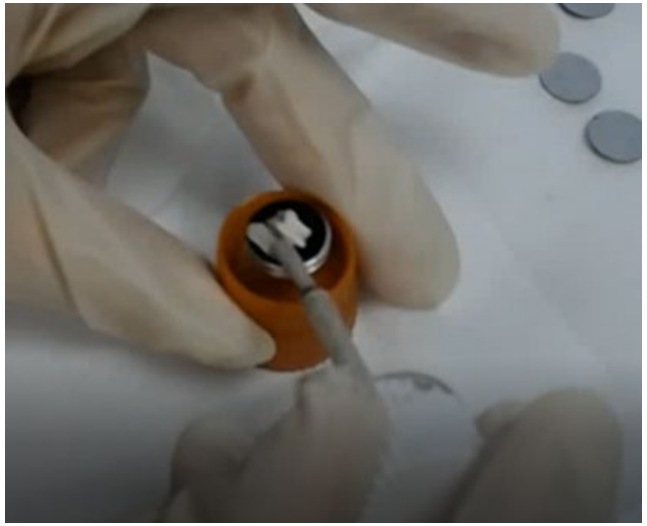
Additional Items

- Trimming knife (glass or diamond)
- Fine jewellers saw for rough trimming
- Bench mounted vice
- Diamond knife for ultramicrotomy
- Fiducials (e.g. colloidal gold)

Tweezers

- Fine handling of small samples, stubs and grids
- One of the most essential tools in your kit
- Wide range of types including:
  - Tweezers for specific types of stub
  - Tweezers to handle grids
  - Sample tweezers, with and without grip
  - Insulated for cryo applications

- Tweezers are usually required for all Volume EM techniques.

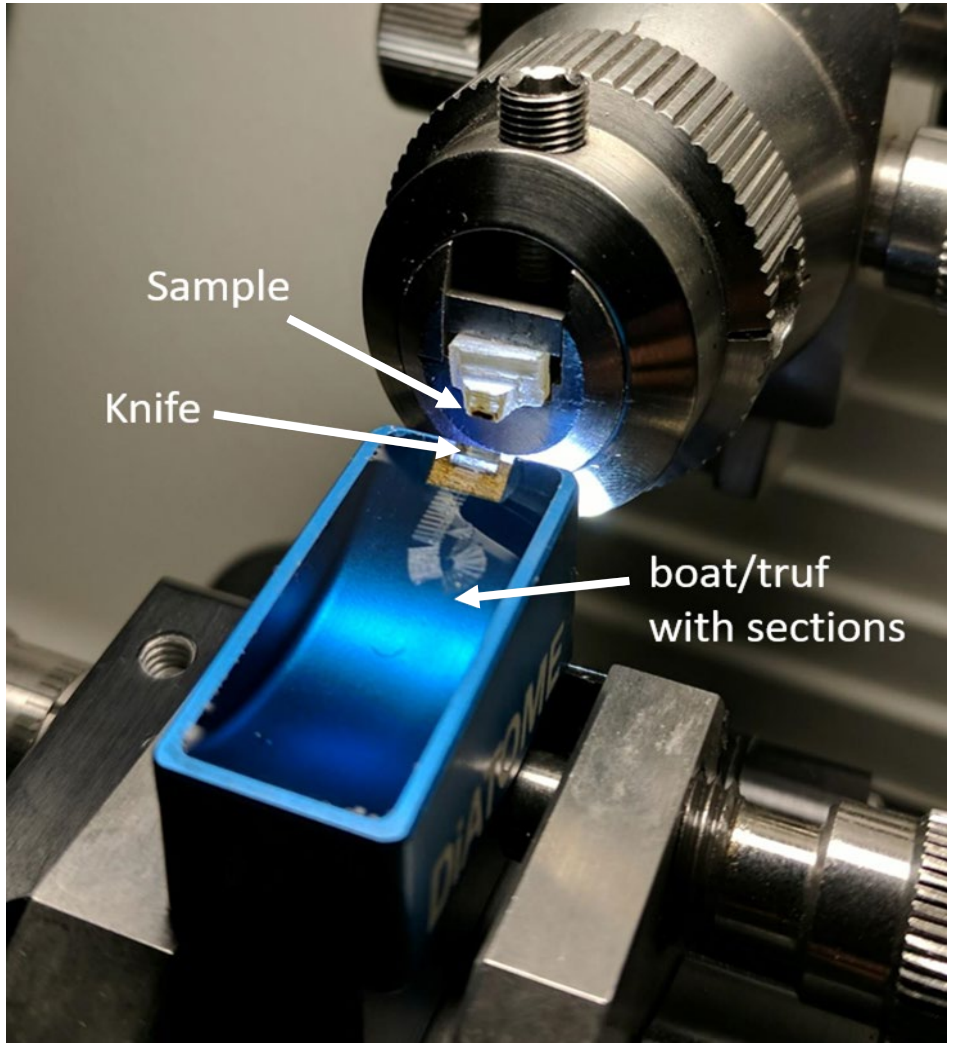


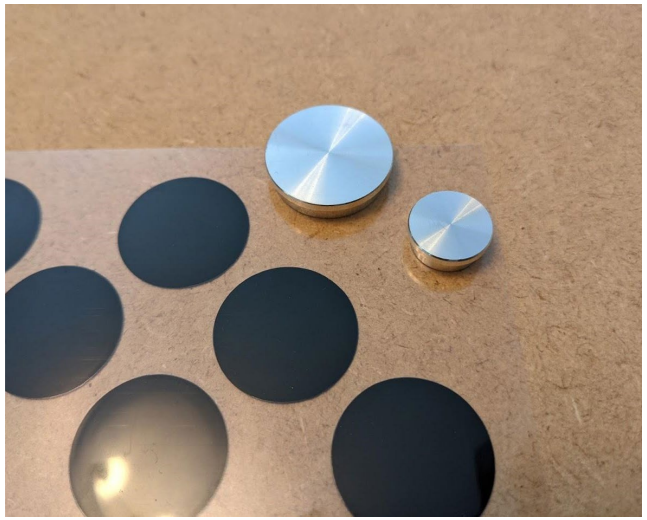
Sample stubs/pins

- Stubs, pins and wafers are designed to support the sample, be conductive and be compatible with the stage of an SEM.
- Different stub and pin styles are available with some being specific to microscope manufacturers. Most will have a pin or screw hole at the bottom to allow attachment to a microscope stage.
- A form of adhesive is required to attach the sample to the stub, pin or wafer.
- Stub specific tweezers may be required to handle the stubs without damaging the sample.
- Stub, pin and wafer holders are available from most EM suppliers. These will hold them secure while not in the microscope.
- Stubs are usually required for all SEM based volume EM techniques and are not required for electron tomography (TEM)

Diamond knives

- Diamond knives are used to trim or section a resin embedded sample.
- Glass knives can also be made using a glass knife maker. These are cheaper, can be sharper initially but are not very durable. Coating the knife can increase the lifespan of the knife.
- Diamond knives are more durable and can last years with proper care.
- Knives for ultramicrotomy (as shown in the image) have a boat or truf that is filled with water. This allows very thin sections of sample to be cut by reducing the friction on the knife edge.
- Knives for trimming a resin block do not have a truf and the sides of the knife will be exposed.
- 35° or 45° angles diamond knives are typically used.
- Oscillating diamond knives are useful for techniques such as array tomography, where automated collection of sections occurred onto a tape and there is not option for stretching the compressed sections. A knife with oscillation compresses sections less than a normal diamond knife.
- All volume EM techniques require a trimmed sample or sections. Samples can be trimmed by hand without using a knife. Knives are required to produce sections.





Adhesives and paint

- Adhesive media is usually required for the SEM based volume EM techniques (array tomography, FIBSEM, SBFSEM) to attach the samples to stubs.
- Carbon sticky tabs or carbon tape provide mild conductive adhesion, suitable for attaching array tomography tape.
- Silver dag/paint can be used to increase conductivity of a sample by applying it to the support medium and the edges of the sample (avoiding areas to be imaged). The paint will help stabilize a sample when dry but is not an adhesive.
- Conductive epoxy is used to attach samples to stubs and pins and provides a strong bond. This is often used to attach SBFSEM and FIBSEM samples to pins and stubs.
- PVA glue can be applied to one edge of a sample to help sections ribbon during ultramicrotomy for array tomography or to help keep sections on the knife for SBFSEM.

EM suppliers

- UK & Europe
  - https://www.agarscientific.com/
  - https://taab.co.uk/
  - https://www.labtech-em.com/em/electron-microscopy
  - https://estore.oxinst.eu/products/nanoanalysis/
  - https://www.microtonano.com/
  - https://emresolutions.com/
- Americas
  - https://www.emsdiasum.com/microscopy/Asia
  - https://www.tedpella.com/
  - https://us.vwr.com/cms/electron_microscopy_sciences
  - https://www.laddresearch.com/scanning-electron-microscopy-supplies
- Australia and New Zealand
  - https://www.emgrid.com.au/associated-companies/electron-microscopy-sciences/
  - https://proscitech.com.au/
  - https://www.microscopysolutions.com.au/
- Rest of World
- Global