

JEOL CRYO ARM™ and inter-operability

Determining the near-atomic resolution structure of a biological macromolecule requires time on a high-end electron cryo-microscope. Depending on the local situation this could mean acquiring images of frozen-hydrated specimens on a JEOL CRYO ARM™ and/or another cryo microscope. To optimize inter-operability between different brands of cryo-microscopes, JEOL have investigated two related aspects: a) the reverse transfer, that is extracting frozen-hydrated specimens from one microscope to be transferred to another one, and b) the usability of a special cartridge designated as AG that are AutoGrid compatible.

Figure 1 shows results from the reverse transfer procedure. A pre-cooled transfer cup was used to ensure the specimens remain in the frozen-hydrated state. A minimal amount of transfer ice is present after the procedure but overall the specimen is in good condition.

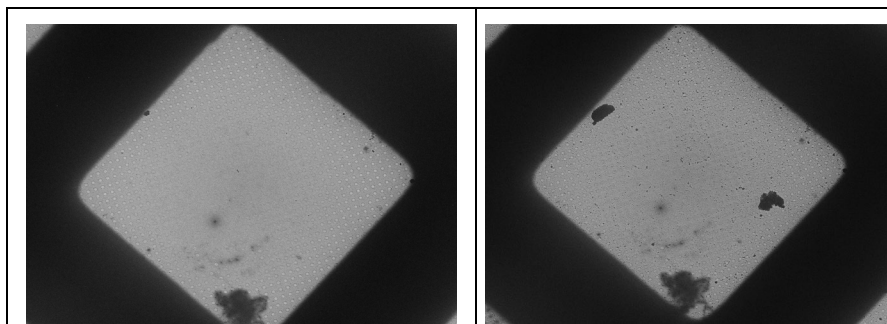


Fig. 1: Images before (left) and after (right) a reverse transfer on a JEOL CRYO ARM™ 300.

Figure 2 shows the cartridges that are critical for complete inter-operability between JEOL and other cryo-microscopes. Two are shown here, the AG-cartridge and the specimen-retrieval cartridge. The AG-cartridge is shown in Fig. 2A as a side-view (top), with the AutoGrid before insertion (bottom left) and after insertion, when it is ready for transfer into the CRYO ARM™ (bottom right). Fig. 2B shows the specimen retrieval cartridge recommended when frozen-hydrated specimens need to be transferred into another microscope. Both cartridges employ a sliding cover to secure the grid in the cartridge. Fig. 3 shows data acquired after a short, 30-min acquisition run on a CRYO ARM™ 300 showing that the AG-cartridge reveals no detriment in collecting high resolution images.

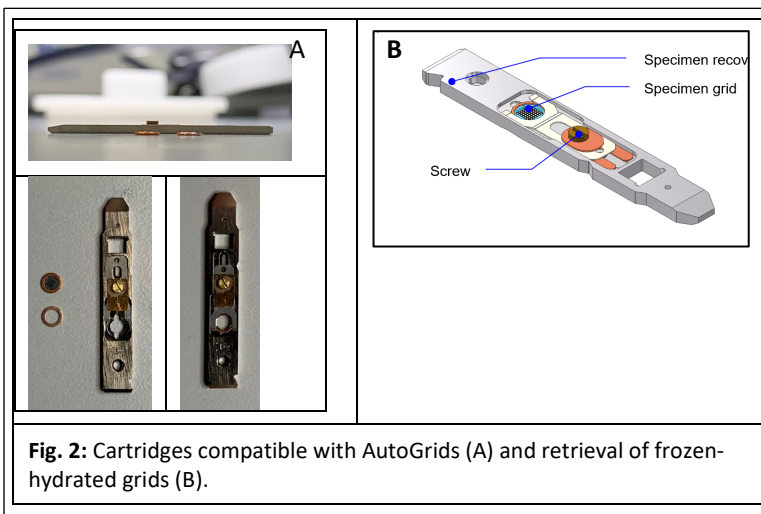


Fig. 2: Cartridges compatible with AutoGrids (A) and retrieval of frozen-hydrated grids (B).

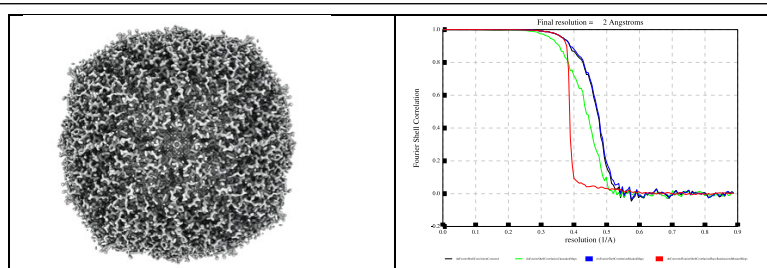


Fig. 3: 3D reconstruction of apo-ferritin after 30 min data collection of sample inserted in an AG-compatible cartridge (A). FSC curve of the dataset comprised of 91k particle showing 2Å resolution (B).

A

B