Using a cryo-compatible Microgripper for cryo TEM Sample Liftout

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Using a specially designed microgripper for work at cryo-temperatures that is attached to a micromanipulator that can be mounted inside the vacuum chamber in a multitude of geometric configurations, provides the means for handling cryo-microsamples in situ. One example would be a pick & place operation, such as TEM sample liftout.

Preparing site-specific TEM lamella on cryogenic samples is challenging for a number of reasons. One of the steps that needs to be performed is the transfer from sample bulk to TEM grid. Using a cryo-compatible microgripper instead of the traditional method of site specific electron or ion beam induced deposition of carbon or metal may yield various advantages, such as:

- eliminating the need for coating the sample with injected material during lamella extraction
- minimum stage tilts are required, when using pre-tilted sample shuttles.
- using a small, nimble micromanipulator allows great flexibility in regard to the sample geometry

Especially the last point is important as it can be difficult to arrange all the necessary parts in the correct geometrical relationship to each other when operating with stage motions constrained by the cryo system.

The transfer of a cryo-TEM slice from the sample bulk to a TEM grid will be shown in this work.