A novel technique to improve the quality of ex-situ lift-out FIB foils

Anja Schreiber and Richard Wirth

Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Telegrafenberg, 14473 Potsdam, Germany

The production of FIB foils applying the ex-situ lift-out technique is a very fast technique that is fully automated and it works very reliable. FIB prepared foils utilising the ex-situ lift-out technique are usually placed on holey carbon films on a copper TEM grid. However, once placed onto the carbon film the foil could not be treated additionally to improve its quality. This was a major drawback of this technique in the past compared with the in-situ lift out technique. Here, we demonstrate that ex-situ lifted out foils can be subsequently FIB treated to reduce foil thickness and Ga-ion implantation. Such a treatment can be applied even several times. We successfully applied this technique to FIB foils from different materials such as diamond, Pt-alloys and Fe-oxide nanoinclusions in diamond. The technique allows site-specific sputtering of material from an existing FIB foil that means selective thinning of a particular grain in the foil. We used a FEI single beam FIB200 at GFZ Potsdam. An interesting application for such kind of subsequent thinning of a specific area of the foil is Transmission Kikuchi Diffraction (TKD) from nanometre-sized crystals resulting in orientation distribution maps. The spatial resolution of the TKD depends on the grain size and thus on the foil thickness. Examples of subsequently FIB sputtered foils are presented.