LATTICEGEAR

Customer Success Story

LatticeAx™ in Action: Downsizing a Glass Slide Containing Delicate Samples

Learn how Penn State University used the LatticeAx to cleanly downsize a standard glass microscope slide and eliminate more than a day of extra work when the specially prepared slide was too tall to fit in their AFM.

The Materials Research Institute (MRI) at Penn State University is a shared-use facility, providing materials imaging and analytical services for University research and industry. Dr. Trevor Clark, electron microscopy team leader at the Institute's Materials Characterization Lab, was completing an analytical service project for a local company that required characterization data on a newly developed set of fibers for submission to a regulatory agency.

Clark's team had finished compiling size, structure and other data using the scanning electron microscope (SEM time, ~4 hours) when the customer had a request from the regulatory agency for additional characterization of the fiber's morphology, this time using an Atomic Force Microscope (AFM).

The team used the SEM for an additional 3 hours to determine which fibers were best suited for AFM, and began the process of preparing the selected samples for AFM characterization. Considerable time (~4 hours) was invested in preparation, with the individual fibers being placed on and well-adhered to a glass slide via double-sided tape and a strong glue, as shown in Figure 1. The tips of the fibers were exposed on all sides and each fiber could be isolated easily for individual characterization. The slide with the fibers was now ready to be mounted in the AFM holder. Unfortunately, with the height needed to accommodate the fibers, the glass slide was too tall to fit in the holder.

Because of this height constraint, the team considered their options. Downsizing this carefully prepared slide was thought to be not possible, as a typical scribing and cleaving process produces edge damage with glass shard and surface contaminating particles. It seemed the only option would be to repeat the entire sample preparation process. The time required to do so would not be trivial. The specific fibers that were best suited for the AFM had already been identified using SEM; repeating this and all of the other steps would be a setback.

"The microline indentation method of the LatticeAx allowed us to reduce the glass slide's size to the exact height we needed, in just seconds and without generating dust particles on our sample. This time savings and cleanly cleaved surface were critical to our project." – *Dr. Trevor Clark, Microscopy Team Leader*

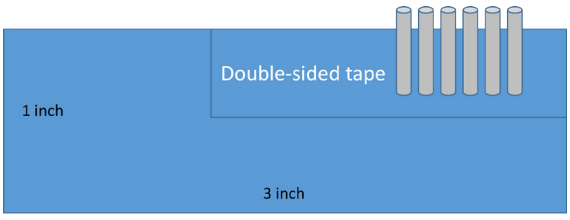


Figure 1. A diagram of the slide showing how the samples were mounted. The slide needed to be downsized to fit the AFM holder, without damaging the fibers that were already carefully selected and mounted.

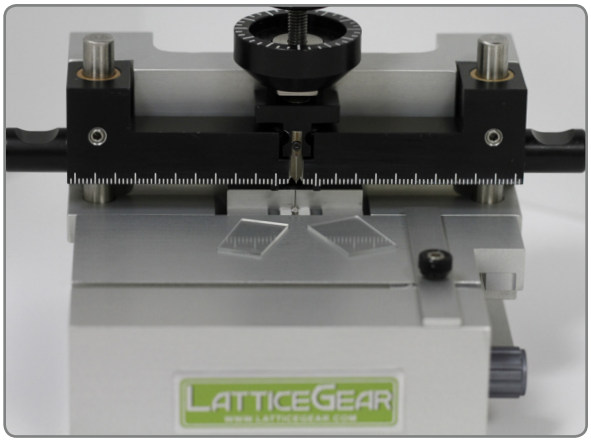
Clark had heard that a LatticeAx cleaving machine was installed at the University in the Nanofabrication Lab cleanroom. He thought that if it was acceptable for the cleanroom, it was worth taking a chance that it could be used to downsize the glass slide cleanly and without producing particles, allowing the characterization of the fibers to move forward more quickly than if they had to repeat the entire sample preparation process.

The chance paid off, saving the team days of time to prepare and re-characterize another set of fiber samples. The glass slide with the prepared fibers attached was placed on the LatticeAx 420 cleaving system and a controlled, shallow, microline indent was made to the glass slide at the specific point where the cleave was needed to downsize the slide to the desired dimension. Their problem was solved quickly—in seconds. The carefully prepared samples remained intact on the slide, and the slide was able to be fit into the holder for the AFM characterization.

Best of all, the scribeless cleave process of the LatticeAx was completely dust free. When Clark first considered the idea of using handheld tools to scribe the glass side, his biggest concern was that scribing would introduce dust particles to the delicate fiber samples already on the slide.

Clark was impressed by the speed and extreme cleanliness of the LatticeAx, as well as the ease with which the desired area could be cleaved. As a core, shared facility, the Electron Microscopy Lab handles a variety of samples, some with challenging preparation requirements. So a machine like the LatticeAx, which is easy to learn and use, and can deliver the desired results repeatedly, is a real asset to a facility with multiple users of varying experience levels.

Clark also sees the LatticeAx as being an essential tool for some Focused Ion Beam (FIB) users as it can reduce the amount of FIB time and supplies required to prepare target areas for imaging and analysis. He is eager to further explore the applications where the LatticeAx can help his users reduce the amount of time they need to prepare samples, while allowing them to start their characterization process with the highest quality cleaved samples.



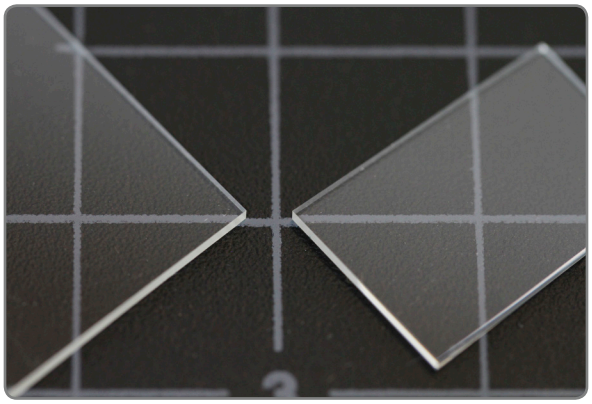


Figure 2. Glass slides cleaved using the LatticeAx. The scribeless cleave process of the LatticeAx eliminates generation of dust particles, making it ideal for downsizing the glass slide that already contained unique, proprietary fibers.

About LatticeGear, LLC.

Company founders Janet and Efrat, two women with extensive applications experience in the semiconductor industry, believe that scribing and cleaving can be accurate, repeatable, easy and fast.

They started LatticeGear in 2012 to provide solutions and resources that help technicians, engineers and researchers increase throughput and productivity for their sample preparation workflows.

From kits that take the guesswork out of selecting supplies for a specific use case, to compact desktop scribing and cleaving machines designed for speed, ease of use and high quality results, LatticeGear solutions are helping to alleviate sample preparation challenges in materials research and failure analysis labs around the world.

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May 24, 2016