

A Simple and Repeatable Stage Alignment Procedure for the D500i Dimpler®

Purpose

TEM sample preparation using dimpling methods has been in practice for several years. A key element to this procedure is the ability to accurately align the dimpling tool relative to the center of the sample holder. In the past this technique has been somewhat time consuming, involving the use of an optical microscope and several sample iterations. This report outlines an effective stage alignment procedure that can be done in a matter of just a few minutes and will accurately align the sample stage to the dimpling tool.

Procedure

The Model D 500i Dimpler® is a precision dimpling instrument designed for fabricating TEM samples for analysis. Precise alignment of the center portion of the platen assembly is important when processing samples for TEM. Samples are 3mm in diameter and therefore precise alignment of the dimpling tool and the center of the sample is imperative. The D 500i is a precision measuring instrument using a non-contact z-height sensor and can be used to determine the actual specimen thickness in real time. Using this sensor a precise alignment procedure can be done using standard tools available with the system.

Before the alignment process begins, the Model D 500i Dimpler® should be turned on for at least 1 hour. This will allow the electronics to warm up and reach a state of thermal equilibrium, making the process more accurate. Once this has been achieved, the system should be in regular operating mode where the arm is balanced and the system ready for standard operation.

1. Place the standard platen onto the stage of the D 500i. This platen has a small hole in the center that is used for the alignment process. Do not mount a sample or place the sapphire flat onto the platen.
2. Flip the toggle switch of the Force / Z Height measurement to Z (μm). Set the force to 50 grams.
3. Mount the 3i Tool (stainless steel dimpling tool) onto the shaft of the D 500i. Lock in place.
4. Rotate the shaft of the system until the Tool Index LED is illuminated.
5. Press the ARM DN button. The arm should come down and the tool will rest on the platen.
6. Adjust the platen using the X and Y translation screws of the stage so the 3i tool is offset from the platen center hole (Figure 1).

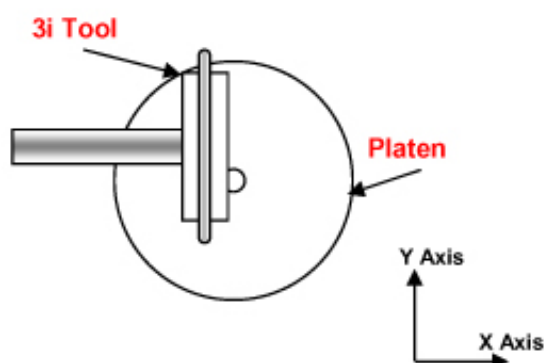


Figure 1: Schematic drawing at left showing the offset position of the dimpling tool. The image at right shows the configuration of the tool and platen during the initial phase of the alignment process.

