UMF Equipment – Gatan Single Tilt Straining Holder System

Model 654

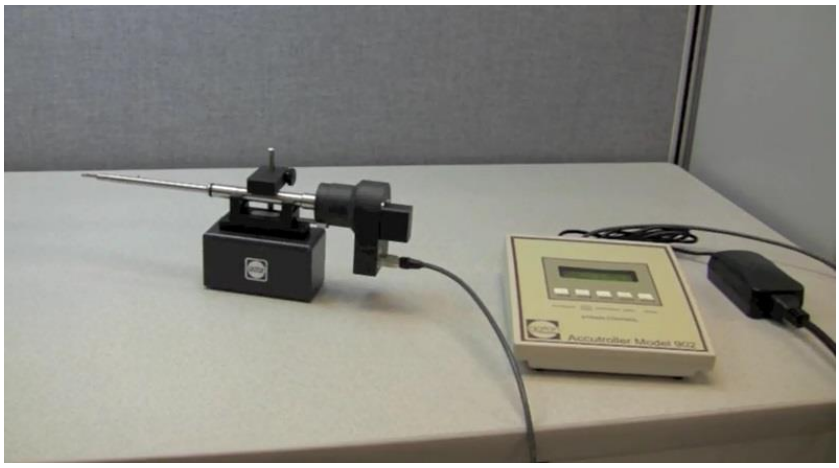
The Gatan 654 single tilt straining holder is used to elongate specimens at controlled rates. It allows elongation at constant rates of electron-transparent specimens in the range of 0.01 µm/sec to 1.0 µm/sec. Elongation can be stopped and restarted at will with a push-button hand control. Tilt ranges are dependent on the pole piece of the TEM. It can be used to quantify microstructural changes in materials due to applied mechanical loading. Mechanisms of deformation in metal and polymer samples, such as grain-boundary sliding, grain rotation, and strain-induced diffusion, can be studied in situ in the TEM by this type of holder.

Features:

- Single push-button operation starts or stops the elongation process.
- Gear reduction needed to provide small displacement rate required in TEM studies is achieved using a 2190:1 low-backlash, spur gear train followed by a 40:1 reduction precision worm and wheel drive.
- Hexlok™ specimen securing mechanism provides firm and secure clamping of the tensile specimen.

Please refer to https://www.gatan.com/products/tem-specimen-holders/straining-situ-holders for further details of the system.

For any inquiry, please contact Dr. Wei Lu (Tel: 34002077; Email: wei.lu@polyu.edu.hk).



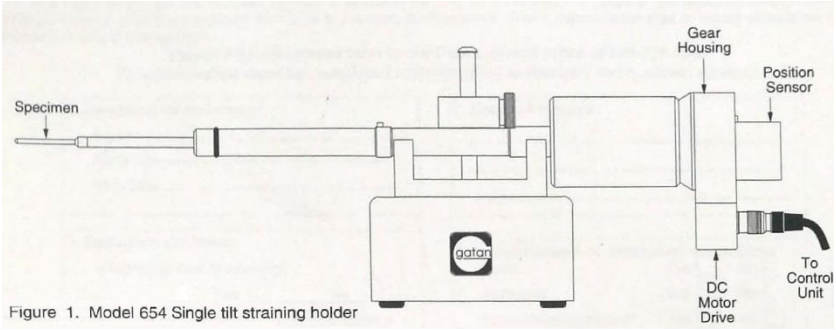


Figure 1. Model 654 Single tilt straining holder

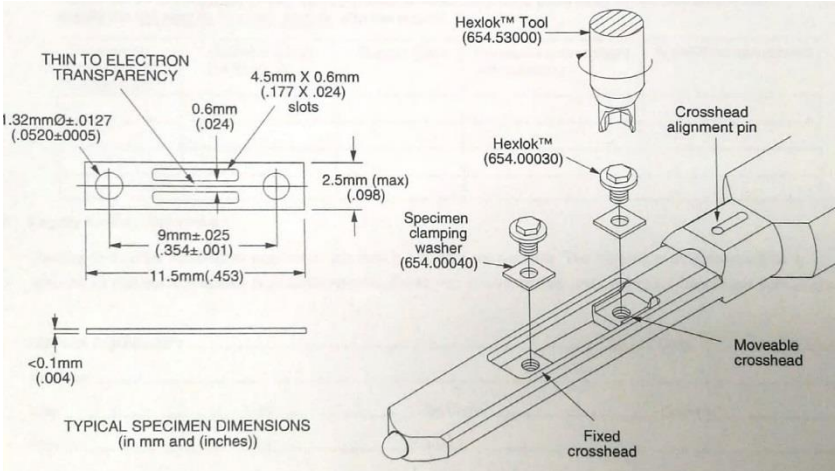


Figure 2. Recommended specimen dimensions and specimen loading tools

Application:

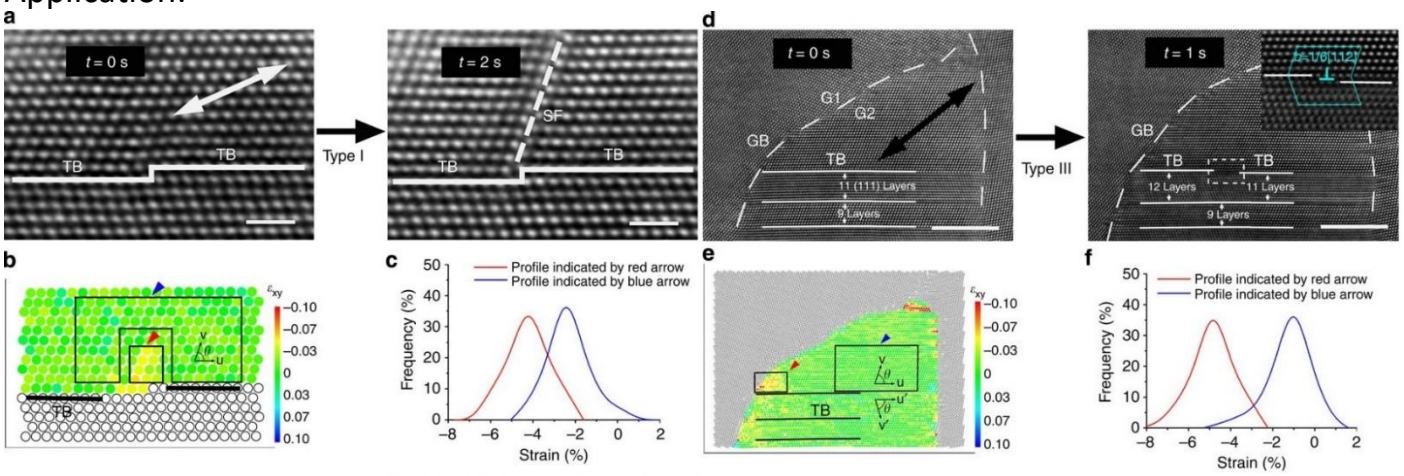


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Fig. In situ HRTEM images during tensile loading. (a) Dynamic process of type I dislocations emitted from a step on the TB. Scale bars, 1 nm. (b) The lattice shear strain determined before the emission, corresponding to the left image of a. (c) Quantitative shear strain analysis of the black-box regions indicated by red and blue arrows in b. (d) Dynamic process of type III dislocations emitted from a TB/GB junction and then slipping along the TB. G1 and G2 are two grains. Scale bars, 5 nm. (e) The lattice shear strain determined before the emission (the left image of d). (f) Quantitative shear strain analysis of the black-box regions indicated by red and blue arrows in e. The loading direction is indicated by double-headed arrows.