Dektak XT Profilometer

Profilometer

Added to the MTTC in 2024, the Dektak XT is an advanced surface topography measurement system designed to achieve nanometer vertical resolution for a variety of samples, with a minimum step height resolution below 1 nanometer. It is capable of characterizing surface roughness and waviness with high precision. The system utilizes a diamond tip stylus to electromagnetically profile surfaces, supported by the Vision 64 software for detailed analysis. This system offers repeatability of less than five Angstroms 1 Sigma and is capable of accommodating samples up to 150mm in diameter and 50mm thick, providing precise measurements with exceptional consistency.

Measurement Capabilities

- **Nanometer Vertical Resolution:** Measures thin and thick film step heights below 1 nanometer with less than five Angstrom 1 Sigma repeatability.
- **Sample Compatibility:** Accommodates samples up to 150mm in diameter and 50mm thick, depending on the configuration.
- **Surface Characterization:** Capable of characterizing surface roughness and wafer thin film stress.

Measurement Process

- **Stylus Profiling:** Uses a diamond tip stylus that moves electromagnetically over the sample surface to record profile measurements.
- **Electromechanical Scanning:** The stylus movement is linked to a linear variable differential transformer (LVDT) to convert height variations into electrical signals, which are then digitized and analyzed.
- **Vision 64 Software:** Utilized for rendering sample topography and conducting various filtering and analysis on the recorded measurements.

Applications

The Dektak XT system is used in a variety of applications across different industries. Some common applications include:

Semiconductor Manufacturing

- Measurement of thin and thick film step heights.
- Surface roughness characterization of wafers.
- Analysis of lithography and etching processes.

Material Science

- Characterization of surface roughness and waviness.
- Analysis of coatings and thin films.
- Measurement of wear and erosion patterns on material surfaces.

Microsystems and MEMS

- Profiling of microstructures and devices.
- Step height measurements in microfabrication processes.
- Surface characterization of MEMS components.

Optics and Photonics

- Surface profiling of optical components.
- Measurement of thin film coatings on lenses and mirrors.
- Characterization of surface roughness in photonic devices.

Solar Cells

- Profiling of solar cell surfaces.
- Measurement of film thickness and uniformity.
- Surface roughness analysis of photovoltaic materials.

Biomedical Engineering

- Surface characterization of biomaterials.
- Profiling of medical device coatings.
- Analysis of wear and degradation on biomedical implants.

Research and Development

- Fundamental studies of surface properties.
- Development of new materials with specific surface characteristics.
- Process optimization in various manufacturing techniques.

Support and Training

We offer comprehensive support and training to ensure you get the most out of our MTTC tools:

- **We can run it for you:** Our staff can run your samples for you and assist in process development.
- **Training:** If you will run your own samples, on-site training sessions are available to master the equipment.

Get in Touch and Schedule a Tour Today!

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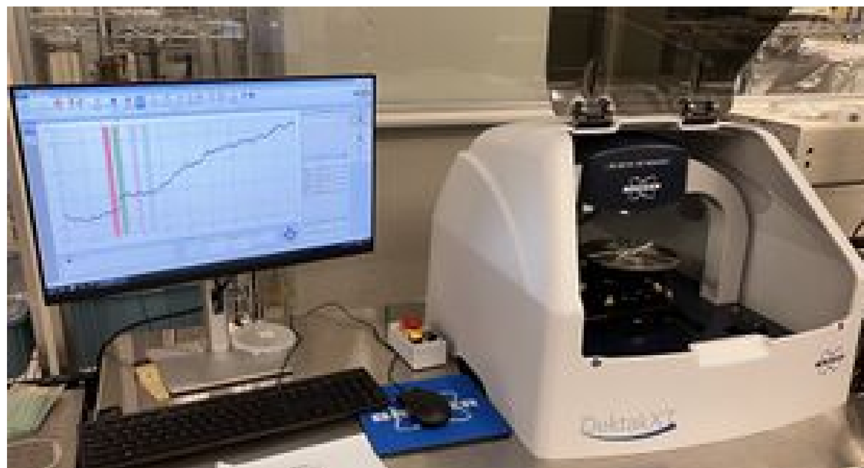

Figure 1: The DekTak XT profilometer.