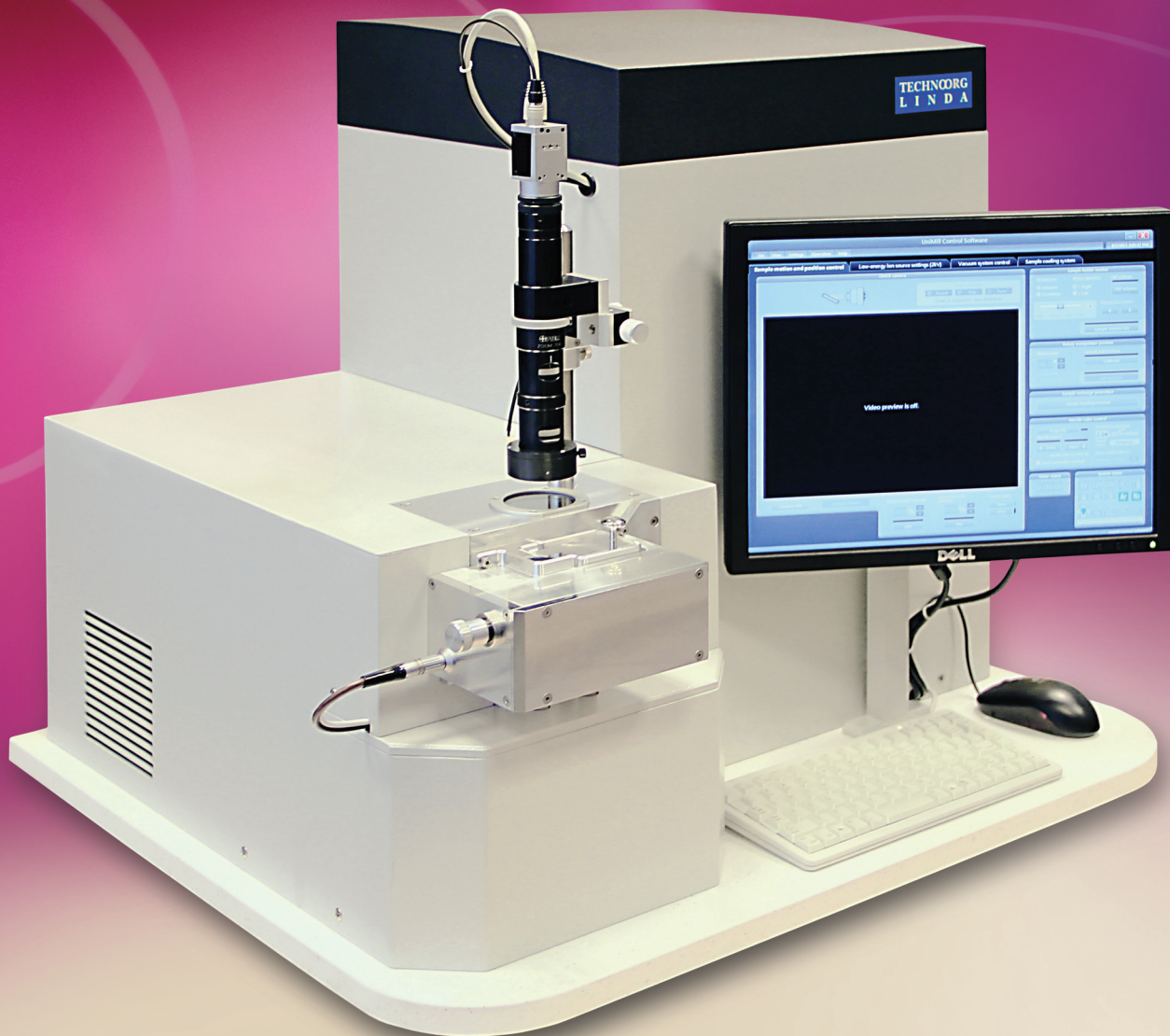


IV7 Sample Preparation System

Rapid preparation of high-quality TEM/XTEM samples...

just a click away...2spi.com/iv7



The IV7 Universal Ion Mill is recommended to users developing new materials or new sample preparation methods. Due to its extremely high milling rate, it is optimal for studying hard-to-sputter materials, such as diamond, sapphire, etc. Its exclusive

capability of producing damage- and artifact-free samples by low-energy ion bombardment provides a unique opportunity to study real nanostructures in synthesized and natural materials in all fields of technical sciences and materials research.



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IV7 TEM/XTEM Sample Preparation System

Low-Energy Ion Source

The exceptional construction of the ion source allows the IV7 to reach high beam current densities through the entire operating range. The beam of extremely low energy noble gas ions guarantees minimization of surface damage and ion beam induced amorphization.

Ion Source Control

All ion gun parameters, including accelerating voltage and beam current, are controlled automatically by a digital feedback loop, but they may still be changed manually during the sample preparation process. The initial values of the ion source parameters are set either automatically or manually, and are continuously monitored and displayed by the computer. Automated Operation

Automated Operation

The IV7 is provided with full computer control utilizing an easy-to-use graphical interface. All milling parameters including the electrode voltages, working gas flow, sample motion/tilt and further parameters of process timing and perforation detection can be stored or pre-programmed in a number of steps. This fully automated feature of the IV7 allows production of high-quality samples with minimum user intervention.

On-Line Monitoring and Support

The IV7 is supplied with a software extension for on-line technical support, which enables for real-time error detection and problem elimination via the internet.

Specifications

- Fast thinning and gentle polishing/cleaning with the same instrument
- Fully automated ion source setup and ion mill operation
- Widest range of ion energies: from 100eV to 20keV using ultra-highenergy and low-energy noble gas ion sources
- Extremely high milling rates: 1300 $\mu\text{m}/\text{hour}$ for polycrystalline Cu at 20keV at 45° 300–600 $\mu\text{m}/\text{hour}$ for monocrystalline Si at 16–20keV at 45°

Power Requirements

- 100–120 V / 10 A / 50–60 Hz
- 220–240 V / 5 A / 50–60 Hz

Ion Sources

Ultra-high-energy ion source

- Ion energy: 2000–20000eV, continuously adjustable
- Ion current density: >150mA/cm²
- Beam current: 250 μA
- Beam diameter: 100–300 μm (FWHM)
- Milling rate: 300–600 $\mu\text{m}/\text{h}$ on c-Si at 16000–20000eV at 45° angle of beam incidence

Low-energy ion source

- Ion energy: 100–2000eV, continuously adjustable
- Ion current density: max. 10mA/cm²

TECHNOORG L I N D A

- Beam current: 7–80 mA
- Beam diameter: 750–1200 μm (FWHM)
- Milling rate: 28 mm/h on c-Si at 2000eV ion energy at 30° angle of beam incidence

Specimen Handling

- Milling angle: 0°–45°, electronically adjustable in 0.1° increments
- Computer controlled in-plane specimen rotation and oscillation (0°–120° angular range, electronically adjustable in 10° increments)
- Remarkable thickness range of the accepted TEM samples (30–200 μm)

Vacuum System

- Pfeiffer vacuum system with oil-free diaphragm and turbomolecular pumps equipped with compact, full-range Pirani/Penning vacuum gauge

Gas Supply System

- 99.999% purity argon gas of 1.3–1.7 bar absolute pressure
- Dedicated pressure regulator for noble gas service with electronic outlet pressure monitoring
- High-precision working gas flow control via motorized needle valve

Imaging System

- CCD camera image for full visual control and milling supervision/termination
- High-resolution (5M pixel) color CCD camera
- Manual zoom video lens of 50–400x magnification range

Computer Control

- Built-in industrial grade PC
- Easy-to-use graphical interface and image analysis module
- User-independent ion source setup including gas flow regulation by motorized needle valve
- Pre-programmed milling recipes for automatic setting of mechanical and electronic milling parameters (manual adjustment is also possible)
- Automated sample loading
- Automatic termination: optical termination of the milling process supported by an image analysis module detecting the sample perforation or monitoring the evolution of surface topography

