STEPHV

Electromechanical Measurement System

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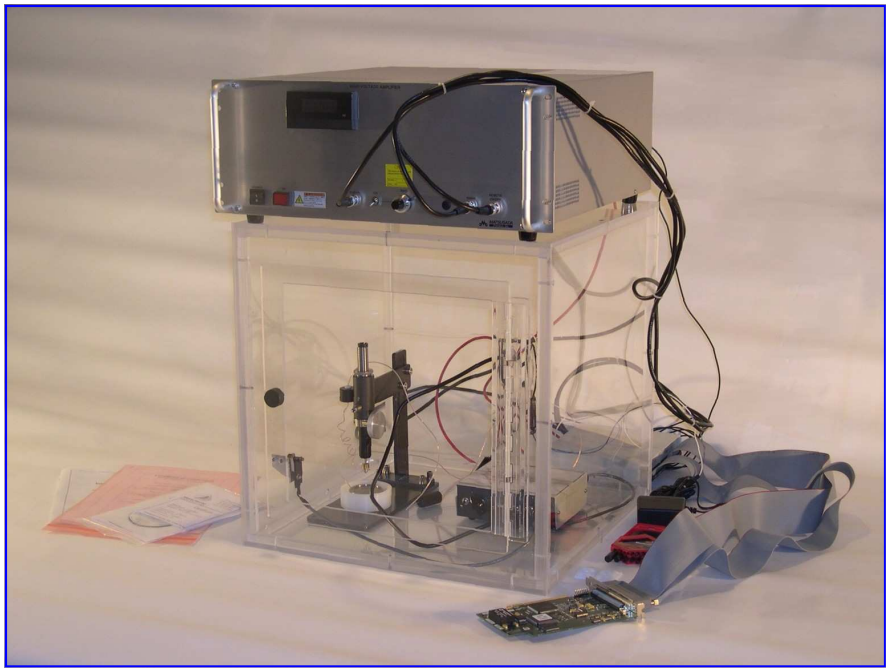
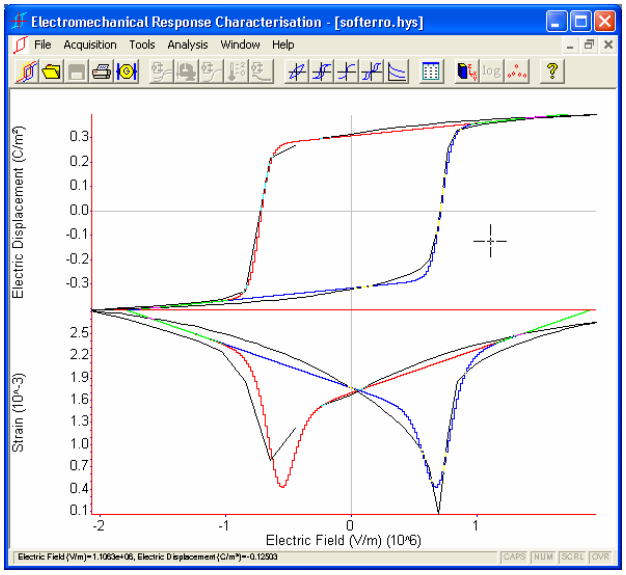
- High voltage measurement system to accompany the Electromechanical Response Characterization Program (STEP)
- Allows simultaneous quasi-static measurement of sample polarization and strain as a function of applied electric field
- Includes:
  - ◊ Knock-down capable acrylic enclosure with interlocks
  - ◊ Sawyer-Tower circuit for polarization measurements including several reference capacitors for different sample types
  - ◊ Electronics to protect A/D converter from high voltage in event of sample breakdown
  - ◊ PCI A/D, D/A converter to run measurement
  - ◊ nm range DVRT strain measurement gauge and signal conditioner
  - ◊ Micrometer assembly for holding sample and zeroing of DVRT
  - ◊ Universal power supply for strain measurement
  - ◊ All required cables and connectors





- Components can be interchanged with other components of better specification on request such as laser-based strain measurement systems or a faster A/D, D/A card.
- Unique micrometer and sample stage permits rapid sample exchange and positive electrical contact with sample electrodes while maintaining micrometer position
- Use with Trek or Matsusada high slew rate voltage amplifiers rated up to 20 kV
- Fully integrated with the Electromechanical Response Characterization Program (STEP), provides turn-key measurement and analysis of ferroelectric, piezoelectric, electrostrictive and anti-ferroelectric electromechanical response
- Reset button for discharging reference capacitor prior to performing measurement
- Space is provided for user-provided reference capacitors
- STEPHV can be purchased without voltage amplifier

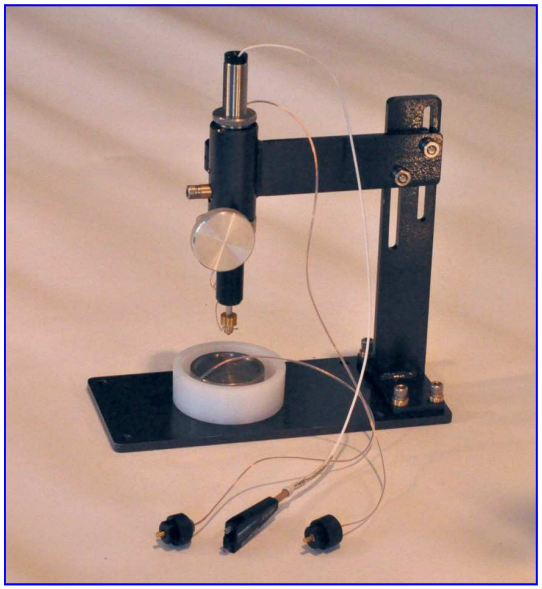
Ferroelectric response including
hysteresis modelled with STEP

System	Value
Maximum sample voltage	20 kV
Maximum waveform frequency	50 kHz (10 points, polarization only)
Enclosure dimensions	44.5 cm cube
Enclosure door opening	30.5 cm square
Enclosure material	Acrylic
Maximum sample thickness	7.5 cm
Weight	32 kg (not including voltage amplifier)
Provided reference capacitors	0.2µF, 0.5µF, 1µF
Power	100-240 VAC, 47-63 Hz
Polarization resolution	Depends on reference capacitor and sample capacitance
Control software	STEP

A/D, D/A card	Value
Card type	USB
Maximum sample frequency	1 MHz multiplexed
A/D channels	16 single ended, 8 differential
Maximum A/D voltages	±10V, ±5V, ±2V, ±1V, ±0.5V, ±0.2V, ±0.1V
In/Out bits	16
Maximum output frequency	1 MHz
D/A channels	2
Maximum D/A voltage	±10V
Type of measurement	Quasi-static

Micrometer Sample Stage

- Unique design permits rapid sample exchange while retaining micrometer displacement adjustment
- Can be adjusted to accommodate wide range of sample thicknesses
- DVRT gauge can be exchanged for optical displacement measurement system
- Sample contacts electrically insulated from rest of micrometer assembly
- Solid brass connectors ensure good high voltage contacts



DVRT Strain Gauge	Value
Resolution	10 nm
Frequency response	20 kHz
Full stroke	~500 µm
Signal to noise ratio	Up to 4200:1
Output signal	0-5 VDC

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