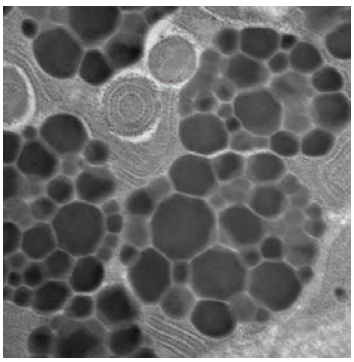
Compact, easy to use, glow discharge system

GloQube® Plus

Glow Discharge System for TEM Grids and Surface Modification



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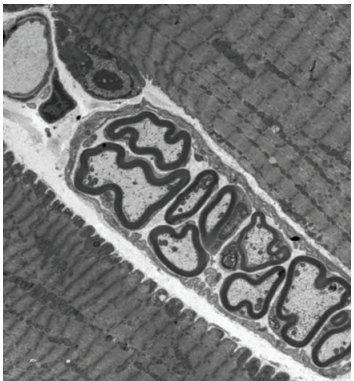
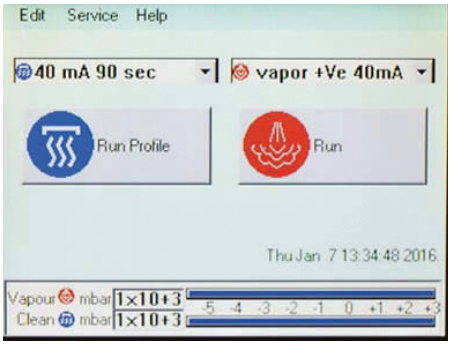


Key Features

- **Glow discharge treatment for electron microscopy sample preparation**
- **Automatic control of vapor and air introduction**
- **Flush and purge cycles of vapor chamber and gas line**
- **Two chambers for separate in-air and in-vapor processes without contamination***
- **Fully automatic**
- **Loaded with typical standard recipes**
- **Password protected user profiles and programmable user recipes**
- **Negative and positive discharge modes**
- **Single door for easy sample loading**
- **Adjustable three height sample stage**
- **Intuitive touch screen control**
- **Safe vapor delivery using septum-sealed vials**
- **Automatic valving between chambers to prevent cross-contamination**
- **Fast and/or soft venting options**
- **Extended warranty option**

* Only one chamber can be used at a time.



GloQube Plus Start-up Screen

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Rapid, reliable results...

GloQube® Plus

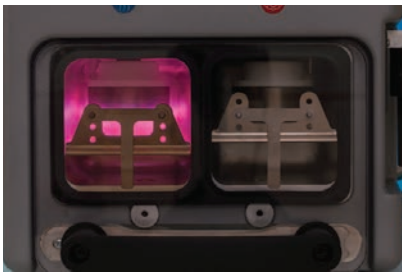
Glow Discharge System for TEM Grids and Surface Modification

The GloQube® Plus is a cost-effective, compact and easy-to-use glow discharge system, designed to fulfil the needs of laboratories with TEM.The primary application of the GloQube Plus is to modify the surface of TEM grids in a way that it meets requirements for successful imaging of a variety of macromolecules. Integrated into one system, the two chambers enable the user maximum flexibility to choose which sample preparation technique they want to use: glow discharge in-air or in-chemical vapor, without downtime for cleaning or the risk of contamination and loss of samples.

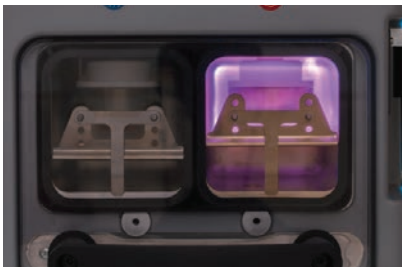
The in-chemical vapor glow discharge doesn't just help with retaining molecules on the TEM grids, but it also allows the user to control the orientation and conformation. With automatic vapor control, the system ensures accurate concentrations of chemical vapor in the plasma, producing reliable and reproducible results. Two chambers designed into one easy to use package provides a smaller footprint for the workflow space and no cross-contamination between the chambers.

Benefits

- **Short in-air cycle time**
- **Second chamber for separating in-air and in-vapor processes**
- **No cross-contamination between chambers due to post-process flush cycle**
- **Automatic vapor delivery ensures reliable and reproducible results**
- **Purge cycles reduce water vapor and oxygen concentrations, ensuring excellent yield of specifically orientated macromolecules**
- **Adjustable slow vent time to minimize sample disturbance**
- **Optional fast vent for rapid process times**
- **Safe handling of reagent**
- **Three level adjustable height sample stage ensures repeatable results**



Clean Chamber



Vapor Chamber

Vapor Delivery System

Glow Discharge Process

Surface State	Surface Charge	Atmosphere	Typical Applications
Hydrophilic	Negative	Air	Hydrophilisation and cleaning of carbon coated TEM grids
Hydrophilic	Positive	Air*	Nucleic acid adhesion to carbon films
Hydrophobic**	Positive	Alkylamine	Controlled orientation and improved adhesion of negatively charged proteins, antibodies and nucleic acids
Hydrophobic**	Negative	Methanol	Controlled orientation and improved adhesion of positively charged protein molecules (e.g. ferritin, cytochrome c)

* Air followed by post-treatment with magnesium acetate by the user.

** Hydrophobic, as noted above, may represent a less hydrophilic sample of less than 90 degrees contact angle.

Applications

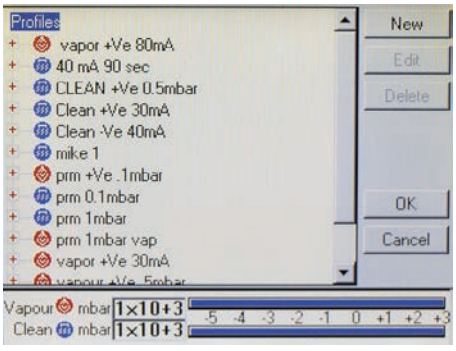
Hydrophilization and cleaning of TEM grids carbon support films* for better sample spreading
Improved adhesion and orientation of proteins, nucleic acids and antibodies
TEM grid preparation for nanoparticle studies

* Typically: Formvar®, Lacey Carbon, Holey Carbon, Continuous Carbon, Quantifoil®

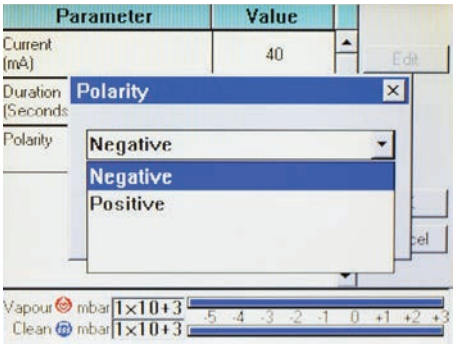
Touch screen control – rapid data input, simple operation

New user interface has been extensively updated.

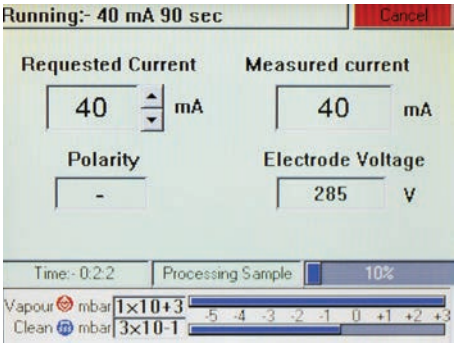
- Capacitive touch screen has improved sensitivity for ease of use
- User interface software has been completely revised, using a modern smartphone-style interface
- Comprehensive context-sensitive help screen
- USB interface allows easy software updates and backing up/copying of recipe files to USB stick
- Process log files can be exported via USB port in .csv format for analysis in Excel or similar. Log files include date, time and process parameters.
- 16GB flash memory can store over 1000 recipes
- Dual-core ARM processor for a responsive display



Stored Profiles



Selecting a New Profile



A Typical Process Run

Easy sample loading

Each of the twin chambers can accommodate two 25 x 75 mm glass microscope slides or TEM grid holders. Loading could not be easier using a drawer-style chamber door and specimen stages. The stages are height adjustable and fitted with removable glass slide holders. The door and stages can be completely removed for convenience and to allow easy access for chamber cleaning.

Twin chambers prevent cross contamination

The GloQube Plus uses a single door with two independent vacuum chambers and adjustable sample stages. The in-air chamber is for simple glow discharge hydrophilic applications, while the in-vapor chamber is designed for hydrophobic (negative or positive) conversions, typically using reagents such as methanol and amylamine. By utilizing purge and flush cycles, we ensure contamination from the vapor chamber* does not affect the in-air chamber.

* For health and safety reasons when using the in-vapor chamber with chemicals the pump exhaust must be vented to a suitable external extraction system

Automatic Valve

The automatic valve system allows greater control over the introduction of chemical vapor into the chamber. This results in reproducibility and repeatability of processing. The self-contained nature of the septum-sealed chemical vials and the delivery system ensures minimal user contact and a high level of operator safety.**

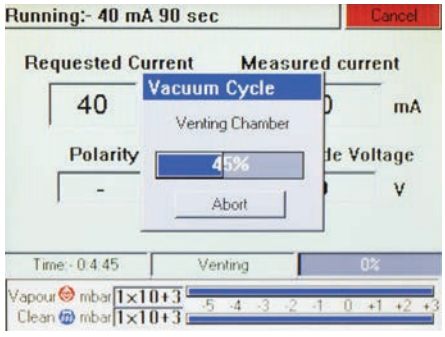
** Chemical preparation and disposal should be carried out in a suitable fume hood

Process control

The GloQube Plus is an automated system, which has a recipe driven process control user interface for ease of use. Filtered inlets ensure that delicate samples, such as carbon coated TEM grids, are not contaminated with particles or dust. The GloQube Plus requires a single vacuum pump working in the 0.1 to 1 mbar range and has a typical pump downtime to operational vacuum of 60 seconds and a total cycle time in-air of usually less than two minutes*. A 750 mm flexible stainless vacuum hose is supplied with the GloQube Plus.

* Using a 30 second glow discharge process

Easy Sample Loading



Pumping Cycle

GloQube Plus and Optional Pfeiffer DUO 6 Rotary Pump

GloQube® Plus

Glow Discharge System for TEM Grids and Surface Modification

Specifications

Note: The pump data is for the Pfeiffer DUO 6

Glow Discharge Processes

Plasma current	1-50 mA
HV power supply	30 W
Maximum voltage	800 V
Electrode polarity – clean chamber	DC glow positive DC glow negative
Electrode polarity – vapor chamber	DC glow positive DC glow negative
Sample stage	125 x 100 mm (4.9" x 3.94") with location for two 25 x 75 mm (1" x 3") glass slides
Sample stage operational heights	Adjustable 12.5 mm (0.5"), 22.5 mm (0.9") or 35 mm (1.38")
Pump hold time	0-72 hours
Process time	1-600 seconds

Safety

Chamber vent inlets	Filtered air inlets with slow vent options to minimize sample disturbance
On-board reagent storage	Reagents are contained in sealed glass vials to minimize exposure to hazards
High voltage safety interlocks	Hardware safety interlocked and software for process control

Vacuum

Vacuum control	Integrated pirani gauge
Working vacuum range	0.1 to 1 mbar
Pump min. requirements	5 m^3/hr, Inlet flange: KF 16.
Pumping time	Typical pump time to an operational vacuum of 0.1 mbar in 60 seconds
Vacuum isolation	Isolation valves to switch vacuum and prevent process chamber cross-contamination

Dimensions

Instrument size	336 mm H x 364 mm D x 336 mm H
Instrument weight	19.4 kg
Pump*	391 mm W x 127 mm D x 177 mm H
Pump weight	16 kg
Footprint with pump	366 mm W x 600 mm D x 336 mm H

Communications

Interface	USB
Power requirements	120 V 60 Hz, 15 A or 230 V 50 Hz, 10 A
Instrument power rating	100-240 V AC 60/50 Hz 700 VA including pump, IEC inlet
Pump power rating	115/230 V 60/50 Hz 450 W

Front Cover Micrographs:

Top: *Pseudomonas fluorescens*

Middle: *Trematodes. Photo: Yann Quilichini (Microscopy Platform of the University of Corsica - Corte)*

Bottom: *Longitudinal Section of Mouse Skeletal Muscle - Nerve Cup (dense area myelin sheath). Photo: Nacer Benmeradi (R & D - DeltaMicroscopies-France)*

Ordering Information

Cat No.	Description	Qty.
GloQube Plus	Dual chamber glow discharge system, Model #025235. Accessory kit, including: mains power lead, rotary pump power lead, oil mist filter and clamp, 750 mm long flexible stainless steel vacuum tube with clamps, fuses, glass vials, vial caps and sealing washers, needle (spare). Vacuum pump to be ordered separately.	each
Vacuum Pumping		
91003	5 m^3/hr Pfeiffer DUO 6 two-stage rotary vacuum pump with oil mist filter	each
96001	Vacuum Pump Exhaust Filter including adapter (½" female NPT to ¾" BSPT with ¼" NPT plug)	each
Options, Accessories and Spares		
EMS-Glo-11	Microscope Slide Tray	each
EMS-Glo-12	Glass Vial	10/pk
EMS-Glo-13	Glass Vial Caps	3/pk
EMS-Glo-14	Needle	each
EMS-Glo-15	Door Seal	each

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