



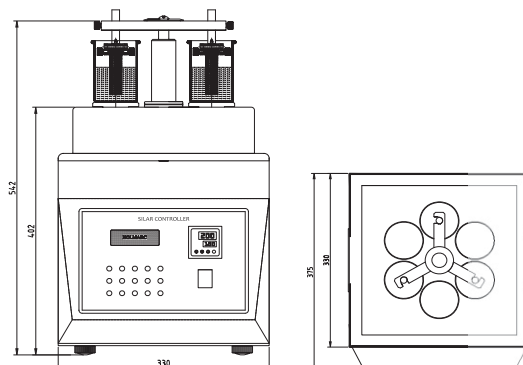
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This device can be customized as per requirement. Holmarc has developed models where a controlled heater is used for keeping each beaker at specified temperature independently.

Specifications

Actuator	Stepper motor
Drive mechanism	Lead screw
Dip duration	0 - 99 sec / min / hr
Number of dips	1 - 999
Operating temperature	Ambient to 80°C
Power input	230V, 50Hz
PC connectivity	Serial port (RS 232)
Stroke length	75mm
No. of position for beakers	6
No. of samples could be loaded	5
No. of programs	5



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HOLMARC RESEARCH TOOLS
OPTO-MECHATRONICS PVT.LTD VR4 PRODUCT CATALOGUE



SILAR Coating System

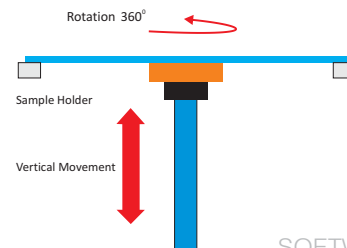
Single, common heater

Model : HO-TH-03

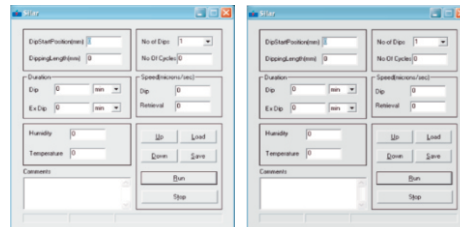
Holmarc's SILAR Coating System has been designed to automate the entire process to avoid operator fatigue and errors associated with it. In manual SILAR process, the operator has to perform hundreds of repetitive dipping into the solution and water. It is very difficult to control dip duration and number of dips in a manual process which can last hours.

In this system, thin film is deposited on glass substrate following a chemical technique called Successive Ion Layer Adsorption and Reaction (SILAR). The process involves multiple dipping of the substrate in a given solution and deionized water, temperature of both can vary from case to case.

In the automated unit, the operator need just to clamp the substrate into the holder and program the controller with required dip cycles and duration.



SOFTWARE



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Managing Director

117 UV-VIS-IR OPTICS

157 POSITIONING DEVICES

238 ANALYTIC INSTRUMENTS

271 LABORATORY EQUIPMENTS

361 IMAGING DEVICES



Syringe Pump / Infusion Pump



SPLF Series

Holmarc's SPLF series syringe pumps are versatile products ideal for precise dispensing of fluids in laboratory experiments, available at an economical price. Our bench-top Syringe Pump has been designed for safe and ultra-smooth fluid flow for lab applications and can be easily set up inside a standard fume cupboard. Holmarc manufactures syringe pumps in various models for single syringes, two syringes, four syringes and ten syringes.

These pumps can operate with standard off the shelf syringes in plastic, glass and stainless steel. The dispensing rates / flow rates possible with these devices are very wide in range and can vary from 15.63ul/hr to 36.2ml/min, depending on the size of syringe used. The unit has built in electronics with keyboard and display for programming the operational attributes to work in standalone mode. This series of pump shows all the pertinent, real-time information on the LCD display. The Information displayed includes flow rate and total time remaining.

Computer interfacing is also possible whenever required with RS 232C serial interface integrated into the control electronics of the system. This model supports dispensing as well as withdrawal. Powerful drive motors and innovative design have been combined with software control to deliver ultra-smooth and steady flow rates. Apart from all these, this device can be customized as per requirement.

Features :

- ✓ Smooth and Continuous mode of operation
- ✓ Automatic dispensing of small volumes
- ✓ Better flow performance
- ✓ Easy to configure
- ✓ Vibration and noise free working
- ✓ Choice of unit selection for flow rate & Duration/Target volume
- ✓ RS-232 interface for computerizing
- ✓ Constant delivery of fluids
- ✓ Can accommodate Multi-size syringes
- ✓ Compatible with glass, plastic and SS syringes
- ✓ Front panel with keyboard and display for programming
- ✓ Non-volatile memory of all parameters and programming
- ✓ Dispensing accuracy of +/- 1%

Syringe	Diameter*	Flowrate
5 ml	10.3mm	15.63 μ l/hr - 10.6 ml/min
10 ml	14.57mm	31.27 μ l/hr - 21.2 ml/min
20 ml	19.05mm	53.45 μ l/hr - 36.2 ml/min
30 ml*	21.59mm	68.65 μ l/hr - 46.5 ml/min
50 ml*	28.9mm	123.0 μ l/hr - 83.3 ml/min
60 ml*	26.6mm	104.2 μ l/hr - 70.7 ml/min

* Available on special request

Model	Item	Temp. control	No. of Syringes
HO-SPLF 1	Single Syringe Pump		One
HO-SPLF 1H	Single Syringe Pump with temperature control	RT - 60° C	One
HO-SPLF 2	Dual Syringe Pump		Two
HO-SPLF 2H	Dual Syringe Pump with temperature control	RT - 60° C	Two
HO-SPLF 4	Four Syringe Pump		Four
HO-SPLF 4H	Four Syringe Pump with temperature control	RT - 60° C	Four
HO-SPLF 10	Ten Syringe Pump		Ten
HO-SPLF 10H	Ten Syringe Pump with temperature control	RT - 60° C	Ten
HO-SPLF 2D	Independently controlled Dual Syringe Pump		Two
HO-SPLF 2DH	Independently controlled Dual Syringe Pump with Temperature control	RT - 60° C	Two



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SPLF 2D series

This model can accept two different size syringes which varies from 5 mL to 20 mL. Any type of syringes can be used in the unit including glass, plastic or stainless steel. This pump is ideal for more complex multi-step reactions and has multi-mode operation including infusion only or withdrawal only. A piston holder is provided in order to bring the piston back to home position. In our dual syringe model no: SPLF 2D, two syringes can operate independently with different flow parameters. This device can store up to 5 programs which can be reviewed or changed during operation. The front panel display allows the user to see all of the pump's operating parameters to ensure proper operation during the experiments. Syringe size and flow rate are easily displayed, as well as the time remaining.

SPLF-H series

In SPLF-H series pumps, temperature control of the syringe is possible. A glass syringe equipped with heating coil is provided along with this device. The temperature of the solution in the syringe is controllable up to 60°C from ambient. This heating option is available in various models with single syringe, two syringes, four syringes and ten syringes.



*Actual diameter may vary depends on the syringe manufacturer.

Syringe
Standard off the shelf syringes
5mL to 20 ml, any manufacturer

Flow rate range
*15.63ul/hr to 36.2ml/min
*actual volume may vary depends on syringe size & manufacturer

Temperature control
RT to 60°C (in selected models)

Flow rate will vary depending on the syringe size

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311
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117 UV-VIS-IR OPTICS

157 POSITIONING DEVICES

238 ANALYTIC INSTRUMENTS

271 LABORATORY EQUIPMENTS

361 IMAGING DEVICES

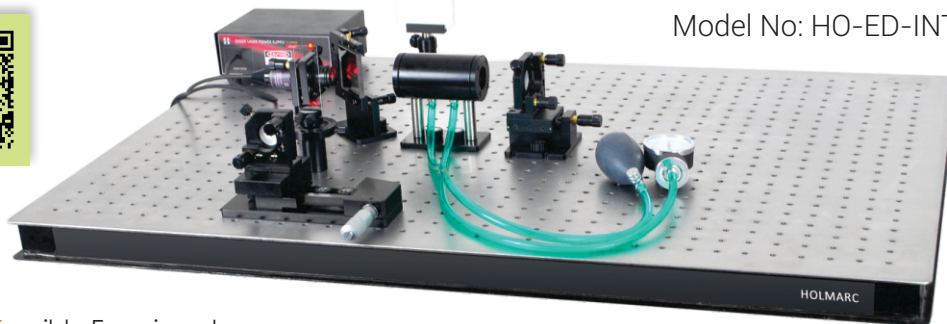


PHYSICS

LABORATORY EQUIPMENTS

Michelson Interferometer (Standard Model)

Model No: HO-ED-INT-06

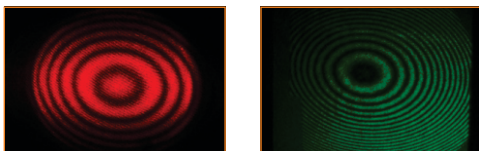


Feasible Experiments

- To determine wavelength of laser beam.
- To find refractive index of a transparent material.
- Determination of refractive index of air.

Features

- The instrument uses laser diode as light source
- Precision kinematic mounts for optical components.
- The optics used in this device are of research quality
- The assembling and alignments are easy, can assemble individually.



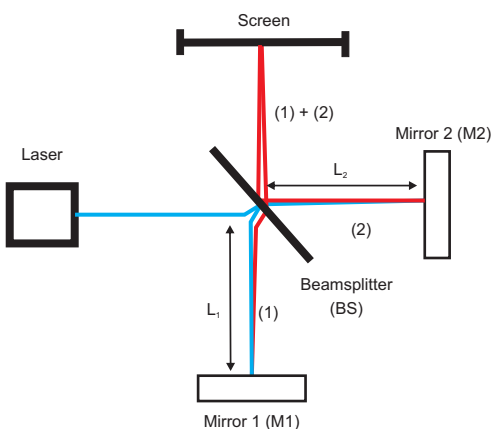
Michelson interferometer is a widely used instrument for measuring wavelength of light, refractive index of transparent materials etc. The interferometer (Model No. HO-ED-INT-06) is designed and constructed in modular fashion. The beam splitter is designed to reflect 50% of the incident light and transmit the other 50%. Therefore the incident beam splits into two beams, one reflected towards mirror M and the other transmitted towards mirror M. Both the beams get reflected at the respective mirrors. The reflected beams from M and M superimpose at the beam splitter and the interference pattern can be observed on the screen.

Go through...

- Interference of light
- Constructive Interference
- Destructive interference
- Wavelength of light
- Refractive index

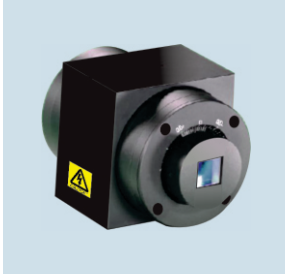
Set of components

Optical Breadboard with support (800mm x 600mm)	1 no.
Kinematic laser mount	1 no.
Mirror mount with translation	1 no.
Mirror mount with precision translation	1 no.
Rotation stage (Resolution 2° / division)	1 no.
Screen with mount (Dimension 75 x 75mm)	1 no.
Pressure cell (Pressure Range = 0 - 300 mm Hg)	1 no.
Mirror with cell (Borofloat)	2 nos.
Beam splitter (size = 50 X 50 X 4mm)	1 no.
Glass slide (Float)	5 nos.
Diode laser with power supply (650nm)	1 no.
Diode laser with power supply (532nm)	1 no.





Faraday Isolator (Optical Isolator)



Faraday isolators are optical components which allow light to travel only one direction. Their mode of operation is based on non-linear Faraday effect (magneto rotation). In principle, the function of an optical isolator is analogue to that of an electrical diode. Faraday isolators are composed of three elements: entrance polarizer, Faraday rotator and exit Polarizer.

It is used to protect a laser source from destabilizing feedback or actual damage from back-reflected light. The 5mm aperture Faraday isolators are cylindrically-shaped magneto-optic devices. Strong Neodymium Iron Boron permanent magnets are used to generate axially-oriented fields within the magnet housing. In operation, the magnet housing is sandwiched between input and output polarizers that have their transmission axis oriented 90 degrees relative to each other. In the reverse direction the backward traveling beam has a polarization orthogonal to the input polarizer and is therefore crossed with it, resulting in a rejected beam exiting the input polarizer.

We also provide custom designed isolators, as per requirement. Please feel free to contact us.

Model	Center Wavelength	Aperture	Transmission	Isolation Min/Typical	Polarizer Type	Rotating Medium	Power Handling
HO-FI410	410nm	5mm	80 / 82 %	30 dB	Calcite	MR3-2 Faraday Glass	> 25 (Joules/cm ²) at 1064nm 10ns pulses
HO-FI532	532nm		85 / 89 %	36 / 40 dB			
HO-FI632	632.8nm		85 / 89 %	35 / 38 dB			
HO-FI650	650nm		85 / 89 %	35 / 38 dB			
HO-FI785	785nm		85 / 89 %	35 / 38 dB			



Optical Chopper

Model No: HO-IAD-OC-01

HOLMARC
Speciality Instrument



An optical chopper is a mechanical device which physically chops a light beam into discrete light pulses. It is widely used in various optical experiments. It modulates different light sources with given frequency for their subsequent analysis.

The chopping discs come in a variety of slot apertures and can be replaced with ease.

Holmarc's optical chopper is a stable device through out the frequency range. The basic system consists of control unit, rotating head and a set of four chopper discs. A DC motor drives the rotating head in closed loop control. Chopping discs are replaceable by the user with ease. A heavy base to which the rotating

assembly is fixed provides stability during operation. Optical axis height is approximately 100 mm. The required disc depending on the frequency can be fixed to the rotating head. This system can provide wide range of frequencies (10Hz - 3.7kHz.) A wide selection of additional discs and accessories are available to extend the frequency range and to satisfy individual requirements. Frequency is displayed directly on the digital display of the control unit. Easy-to-interchange blades are made of corrosion protected material for durability.



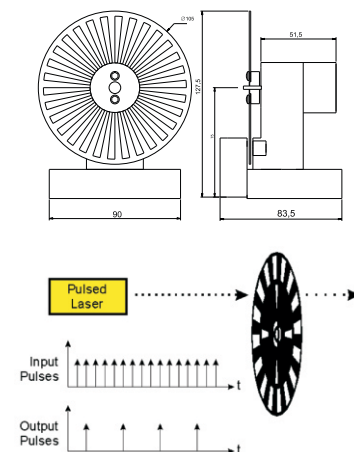
Specifications

Frequency

- Five slot
- Thirty slot
- Ninety Slot
- Chopper wheel diameter : 105mm
- Stability : +/- 1 Hz
- Frequency read out : 16X1 line LCD
- Reference pick-up : IR LED and photo transistor pair
- Motor cable length : 2m
- Operating temperature : 10-50°C
- Power input : 230V, 50Hz

Custom Single and Dual Frequency Optical Chopper Blades can be also manufactured. We welcome queries for customization.

Custom single & Dual Frequency
blades Available up to
11 kHz Chopping Applications





Honeycomb Tabletops

Honeycomb tabletops from Holmarc provide rigid and stable optical working surfaces with the convenience of tapped holes at 25mm grid for mounting components and modules. Honeycomb core made of 0.25mm thick aluminium sheet. Though compressed particle boards are used as side walls in most cases due to its vibration damping properties, Holmarc can also provide tabletops with steel and aluminium side walls. Semi-solid epoxy is used to construct the honeycomb core as well as to bind top and bottom skins to the core. This special epoxy binding absorbs low frequency vibrations to a certain extent and provide considerable damping even without the use of isolated supports.



Magnetic Specifications

- ▶ 5mm thick magnetic SS top skin.(SS410)
- ▶ Bottom skin made of 5 mm thick epoxy coated steel
- ▶ 0.25 mm thick aluminium honeycomb core.
- ▶ Core cell size of 6 sq. cm.(approx.)
- ▶ Nylon cups under each tapped holes
- ▶ +/- 0.1 mm of flatness on top over 300 mm x 300 mm area (non-cumulative error)
- ▶ M6 tapped holes at 25 mm grid.
- ▶ Semi solid epoxy bonding
- ▶ Side walls finished with black form sheet having matte finish
- ▶ Compressed wooden particle boards as side walls to damp acoustic vibrations.

Non-Magnetic

Specifications

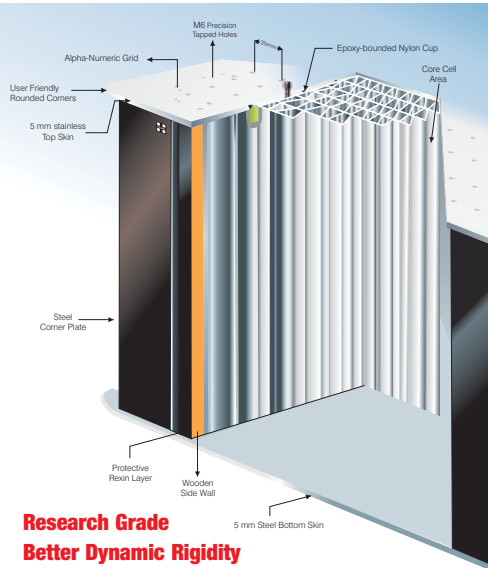
- ▶ 5mm thick non-magnetic SS top skin(SS304)
 - ▶ Bottom skin made of 5 mm thick epoxy coated non-magnetic steel (Ss304).
- All other specifications remain the same as those of magnetic honeycomb table top.



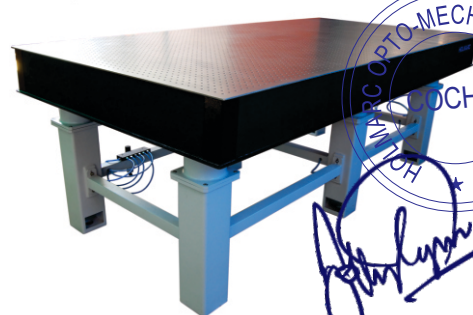
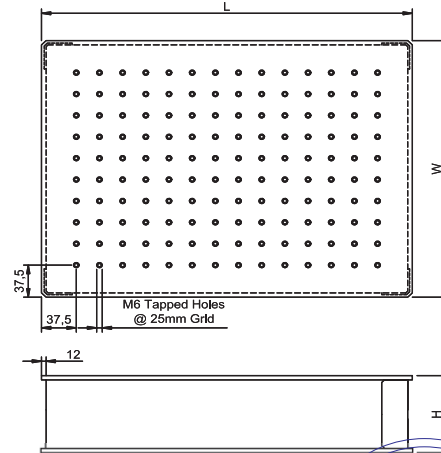
MAGNETIC SKIN	NON MAGNETIC SKIN			
Model No:	Model No:	Length (cm)	Width (cm)	Height (cm)
TT 90-90	TTNM 90-90	90	90	15
TT 120-90	TTNM 120-90	120	90	15
TT 120-120	TTNM 120-120	120	120	15
TT 180-120	TTNM 180-120	180	120	20
TT 240-120	TTNM 240-120	240	120	20
TT 300-120	TTNM 300-120	300	120	20
TT 180-150	TTNM 180-150	180	150	20
TT 240-150	TTNM 240-150	240	150	20
TT 300-150	TTNM 300-150	300	150	20
TT 360-150	TTNM 360-150	360	150	20

Refer Page 018

TABLETOP SUPPORTS



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Better Dynamic Rigidity



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TABLE OF CONTENTS

001 OPTICAL TABLES, BREADBOARDS, RAILS & CARRIERS

030 OPTOMECHANICS

117 UV-VIS-IR OPTICS

ANALYTIC INSTRUMENTS

38 ANALYTIC INSTRUMENTS





Spin Coating Unit

Model : HO-TH-05

Holmarc's Spin Coater, Model no: HO-TH-05 is a dedicated tabletop system to spin coat small substrates in research laboratories with well controlled spin process parameters. The high speed and duration range allows the user to achieve the desired thickness or thinness of the film. The spin head actuator is a precision DC servo motor, which requires less maintenance, with accurate speed and acceleration control. A vacuum chuck powered by oil-less vacuum pump holds the substrate at the spinning head.

The device has user friendly front panel having keyboard and LCD for programming the spin process. Spin duration, spin speed, acceleration, etc. are all programmable parameters through the front panel. As the program memories non-volatile, the recorded parameters are not lost in case of any power failure. This model is equipped with a memory of 9 pre-set, editable programs, each having 9 steps.

The device is compact and complete with electronics built into the unit within a footprint of 275 x 400 mm. All components in the device are corrosion protected to make it clean room compatible. The spin chamber is constructed in nylon with a diameter of 200mm. A transparent protective covering on top of the chamber makes spin coating a hassle free experience. Three sets of PTFE anti-corrosive vacuum chucks are provided along with the equipment for holding substrate from 15 x 15 mm square to 100 x 100 mm square. Solvent drainage and vacuum release facilities are also provided in this device. Holmarc can provide customized models as per requirement.

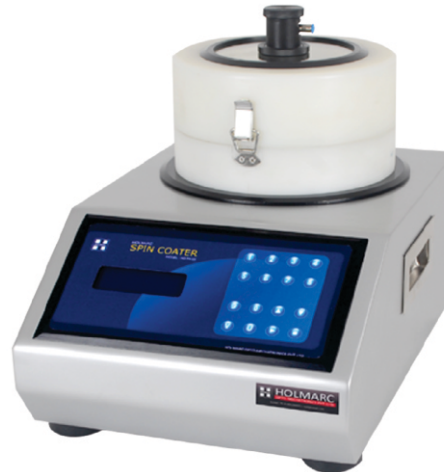
Features :

- ✓ Chuck diameters : 10mm, 22 mm, 35 mm
- ✓ Transparent Safety Lid over the Working Chamber
- ✓ Non-volatile Program Memory
- ✓ User friendly design
- ✓ Back Panel Power On/Off Switch
- ✓ Stand holder to hold pipette to dispense solution.
- ✓ Inlet and outlet for Inert Gas Purging, 6mm tubing *
- ✓ Digital Pipette for dispensing of liquid into the substrate *
- ✓ Stand which is used for holding manual pipette *
- ✓ Vacuum adaptor to fix Petri dishes of sizes ranging from 30 mm - 100 mm diameter *
- ✓ Mechanical clips or locks to hold samples without vacuum *

* optional

Specifications

Actuator	Brushless DC motor
Spinning speed	60 - 9999 rpm
Substrate diameter	30 mm to 70 mm
Power input	230V, 50Hz
Read out	20 x 4 line LCD
Spin chamber	Nylon
Acceleration	5 - 2000 rpm / sec
Spinning Speed Accuracy	< 5%
Programmable parameters	Speed, acceleration, dwell time and no. of steps
Maximum no of steps	9
Program memory	9 programs (non - volatile)
Dimension	400mm Depth x 275mm W x 500mm H



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Spin coating is one of the most common techniques used to deposit uniform thin films to flat substrates. It is used in a wide variety of industries and technology sectors. The advantage of spin coating is its ability to quickly and easily produce very uniform films, ranging from a few nanometers to a few microns in thickness.

In this technique, a small amount of coating material is applied on the center of the substrate, which is either spinning at low speed or not spinning at all. The substrate is then rotated at high speed in order to spread the coating material by centrifugal force. Rotation is continued while the fluid spins off the edges of the substrate, until the desired thickness of the film is achieved. The applied solvent is usually volatile, and simultaneously evaporates. So, the higher the angular speed of spinning, the thinner the film. The thickness of the film also depends on the viscosity and concentration of the solution and the solvent.

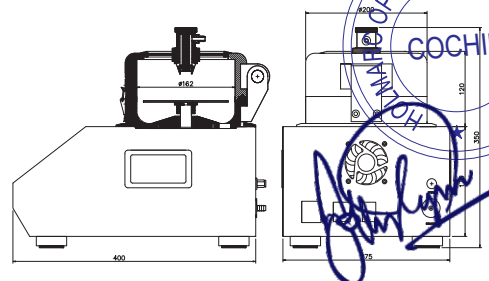


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Applications:

Spincoating is ubiquitous in organic electronics, nanotechnology, semiconductor industries and other Industrial sectors.

Spin coating is widely used in microfabrication of functional oxide layers on glass or single crystal substrates using sol-gel precursors, where it can be used to create uniform thin films with Nano scale thicknesses. It is used intensively in photolithography, to deposit layers of photoresist about 100 nanometers thick.



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117 UV-VIS-IR OPTICS

157 POSITIONING DEVICES

238 ANALYTIC INSTRUMENTS

271 LABORATORY EQUIPMENTS

361 IMAGING DEVICES

361 IMAGING DEVICES




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Spray Pyrolysis Equipment

Model : HO-TH-04

Holmarc's Spray Pyrolysis system has been designed for research laboratories in thin films, especially for solar cell development. The system automates various fatigue and error creating processes involved in the technique when performed manually. Moreover, ergonomically designed chamber provides clean and healthy atmosphere suitable for modern lab conditions.

Parameters like dispensing rate of the solution and speed of spray head movement which are difficult to control manually are controlled precisely by PC based automation. A positive displacement pump controlled by stepper motor and microprocessor is used to dispense solution as per requirement. The spray head movement is also controlled by stepper motor driven linear stages in X and Y direction. The temperature of the substrate heater plate is controlled independently through a dedicated controller.

Factors affecting bonding & subsequent build up of the coating:

- Cleanliness
- Surface area
- Surface topography or profile
- Temperature (thermal energy)
- Speed
- Time (reaction rates, cooling rates etc.)
- Physical & chemical properties
- Physical & chemical reactions

Specifications

Actuator	Stepper motor
Dispensing unit capacity	50ml & 250ml
Dispensing rate	1 - 10ml / min.

Sprayer

Drive speed X axis (min-max)	10 - 800mm / sec
Drive speed Y axis (min-max)	1 - 12mm / sec
Sprayer traverse	X - Y 200mm max.

Substrate base plate

Dimension	150 x 150mm
Max. temperature	500° C
Power input	230V, 50Hz
PC connectivity	Serial port (RS 232)

A desktop computer with windows OS is used to control the operations through serial port. Our dedicated software for spray pyrolysis system can as well be used for documenting the relevant parameters used for sample preparation like temperature, air pressure, duration, etc.

Spray pyrolysis is a process in which a thin film is deposited by spraying a solution on a heated surface, where the constituents react to form a chemical compound. The chemical reactants are selected such that the products other than the desired compound are volatile at the temperature of deposition. The process is particularly useful for the deposition of oxides and has long been a production method for applying a transparent electrical conductor of Tin oxide (SnO₂) or Stannic oxide to glass.

Optional Accessories :

Syringe Pump : Syringe pump is preferable to the glass dispenser for solutions which should be sprayed at lower flow rates (<1ml / min). It works with very low volume of solution as the syringe is directly connected to the spray nozzle, avoiding the use of lengthy tubes which should be filled before the solution can reach the nozzle.

Ultrasonic Spray Head : The standard spray head which uses a compressed air atomization nozzle can be replaced with the ultrasonic spray head which uses an ultrasonic atomizer nozzle. It breaks the solution by vibrating its nozzle at an ultrasonic frequency (Typically 40 kHz), producing a fine spray of droplets of 50 micron average size.



Standard Accessories :

Glass Container : Glass container holds the solution to be sprayed during the coating process. Containers of two volumes (250ml & 50ml) are available as standard accessories.

Nylon Tube : This tube carries the solution from the glass dispenser to the spray head. Nylon is resistant to most of the chemicals which has applications in spray pyrolysis.


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117 UV-VIS-IR OPTICS

157 POSITIONING DEVICES

238 ANALYTIC INSTRUMENTS

271 LABORATORY EQUIPMENTS

361 IMAGING DEVICES

