

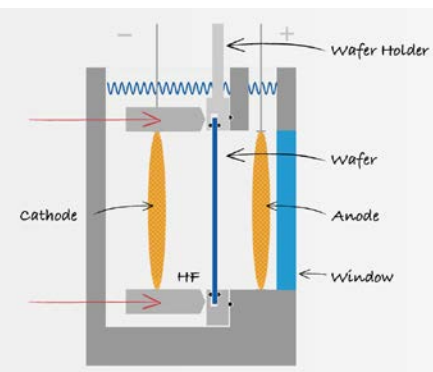
WET ETCHING SYSTEM FOR POROUS SILICON (MPSB)

DOUBLE CELL HF TANK FOR POROUS SILICON ETCHING WITH ELECTROLYTICAL BACKSIDE CONTACT

PRODUCT INFORMATION SHEET



Schematic diagram
of the MPSB double cell wet etching system



The MPSB wet etching system for porous silicon is a complete solution for porous silicon formation and electropolishing of silicon. Together with our Porous Silicon Power Supply PS2, AMMT offers an all-in-one solution for this range of fabrication methods. The MPSB is available for 4", 6" and 8" wafer sizes. For safety purposes, the bath is equipped with connections for continuous HF vapor extraction. PTFE drain valves are connected for direct HF disposal. As an option, an optical windows allows for light-assisted porous silicon formation. An HF resistant sapphire window, supported by thick quartz disks as protection against fracture, can be mounted into sealed flanges. If illumination is not necessary, blind PP covers can be mounted instead.

The wafer is mounted into a removable wafer holder, which is sealed with double O-rings. The wafer holder is then placed in front of the circular opening in the separation plate and is finally fixed in place by a pneumatic actor driven catch. Once the catch is closed, both HF compartments are electrically insulated in the MOhm-range. Two platinum mesh electrodes, one in each cell, are used to contact the wafer from both sides. In order to ensure a homogeneous electrical field, the electrodes are of the same size as the wafer. If a completely metal-ion free environment is required, the Pt electrodes can optionally be replaced by Si sacrificial electrodes. The HF liquid can optionally be re-circulated by a PTFE membrane pump. This circulation loop also allows for HF cooling by means of a in-loop heat exchanger.

TECHNICAL SPECIFICATIONS

Product code	MPSB 100	MPSB 150	MPSB 200
Wafer size	100 mm (4") or smaller	150 mm (6") or smaller	200 mm (8") or smaller
Etchant Volume			
Tank volume only options results in additional volume	~1,4 litre	~2,5 litre	~3,8 litre
Safety receptacle external dimensions			
Width x Height x Depth with vapor extraction	440 x 450 x 440 mm ³	440 x 450 x 440 mm ³	480 x 570 x 480 mm ³
Separation plate	This cell separator plate divides the bath into two chambers and has a circular opening of		
	Ø 92 mm	Ø 142 mm	Ø 189 mm
Electrical isolation bet- ween chambers	> 10 ⁵ Ω when bayonette catch is closed with isolating wafer substitute		
Standard Wafer holder			
Edge exclusion area	7 mm	10 mm	9 mm
HF exposed area	86 mm	130 mm	182mm
Electrodes (2)			
Size (diameter)	90 mm	140 mm	190 mm

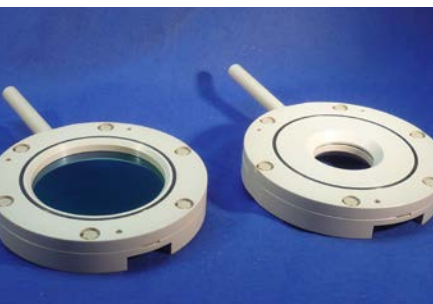
AMMT

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Product code		MPSB 100		MPSB 150		MPSB 200	
Distance between wafer and electrode							
		Si	Pt	Si	Pt	Si	Pt
Processing Side (Left / Anode)		29 mm	35 mm	48 mm	54 mm	46 mm	55 mm
Electrolytical Contact Side (Right / Cathode)		58 mm	52 mm	48 mm	54 mm	46 mm	55 mm
Material	w/ optical window	Platinum meshed electrode (Pt/Ir) in a PEEK frame					
	w/o optical window	Platinum (Pt) plate in a PEEK frame or Silicon sacrificial electrode					
Optical window (optional, Plus system only)							
Size		ø 93 mm		ø 130 mm		ø 189 mm	
Material		1 mm sapphire window backed with quartz disk					
Connections							
Fluidic drain		PTFE hose (ID: 6mm OD: 8 mm)					
Air pressure		6 bar					
Etchant compatibility		HF and HF-ethanol mixtures					
Temperature range		10 °C – 30 °C					

MPSB WAFER HOLDERS

Besides regular wafer holders for 2", 3", 4", 5", 6" and 8" wafers we also offer unique wafer holder for the porous silicon system.

AVAILABLE FEATURES

» Test wafer holder

The test wafer holder allows to perform up to five etches on a single wafer thus helping to increase the speed of development of a set of parameters.

» Chip holder & square substrate holder

AMMT also offers holders for rectangular substrates typically used in the PV industry; holders for individual chip sizes can be manufactured customer specifically for almost any chip or substrate size.

» Silicon electrodes

Some environments require fully metal-ion free wafer processing, for example if the wafers are supposed to go into a CMOS line for further processing. AMMT offers the MPSB also with silicon electrodes, either with Si sacrificial electrodes or with a conductive diamond-like carbon coating.

» HF etchant recirculation & cooling

The HF liquid can optionally be re-circulated by a PTFE membrane pump. This circulation loop also allows for HF cooling by means of an in-loop heat exchanger. HF recirculation avoids etchant depletion at the surface and ensures bubble removal. Cooling the etchant avoids etchant warming if high current densities are desired.

» Wet bench integration

AMMT offers a small-footprint R&D wetbench, which is designed as turn-key system housing the MPSB double cell as well as all other components of the system. It comes with a laptop PC controlling the PS2 constant current source and allows for monitoring the etchant temperature etc.

» MPSB wafer holders

Besides regular wafer holders for 2", 3", 4", 5", 6" and 8" wafers we also offer unique wafer holder for the porous silicon system.

NOTE: Hydrofluoric acid (HF) is an extremely dangerous substance to work with. Special care has to be taken when installing, maintaining and operating this system. In particular, a secure mount of the device and an appropriate vapor extraction has to be assured. AMMT can provide information about the installation and operation of the MPSB, but will not assume any responsibility for harm or damage caused by using this product.