



### **BioJet Macro-Molecular Beam Injector UHV System:**

- for Biology, MALDI-TOF-MS, Organic Semiconductors, NanoTechnology, Organic Surface Chemistry
- High-Intensity Beams for Beam-Surface Reaction and Time-Resolved Reaction Experiments
- Macro-Molecular Beam Injector for Collimated, Scanable, High Flux Molecular Beam (Organic Molecules, DNA, BioClusters >300,000 Dalton) with well Controlled Parameters.
- Electro-Spray Inlet System with High Intensity Beam Ion Source (Primary Ion Energies of 0.5 - 5 keV)
- Heatable and Exchangeable Output Aperture for Material Condensation Prevention
- UHV System with Multi-Stage Differential Pumping System for UHV Compatible Beam Conditions
- Beam Control/Modulation with Shutter and Optical Chopper (0 to 200 Hz)





Detailed Technical Description of the BioJet UHV System:

Pos	Qty	Description
1	1	<p><b>BioJet: Macro-Molecular Beam Injector System, for time-resolved experiments and formation of high-intensity macro-molecular beams:</b></p> <p><u>BioJet for Beam Generation and Beam Forming:</u></p> <p>The Macro-Molecular Beam Injector is designed to produce a collimated, scanable, high flux molecular beam (organic molecules, DNA etc.) with well controlled parameters. It is further equipped with effective heating to prevent material condensation at the orifice. The electro-spray inlet system and source design fit the production of macro-molecular beams.</p> <p>UVH compatible conditions at the end stage of the molecular beam injector are established with a multi-stage pumping system. The differentially pumped pressure system (2 additional differential pumping stages) guarantees a final pressure at the heatable output aperture (SEM aperture, exchangeable, Standard Material = Molybdenum) of <math>2 \cdot 10^{-9}</math> mbar.</p> <p>A shutter and an optical chopper are included in order to control/modulate the gas beam flux.</p> <p><u>Ionization Technique and Beam Introduction System:</u></p> <ul style="list-style-type: none"> <li>• High intensity beam ion source for generation of multiple-charges macro-molecule clusters</li> <li>• Direct Beam Inlet System with high vacuum lock and insertion device (optionally heatable)</li> <li>• Organic-Molecule Emitter up to 10 <math>\mu</math>A Emission</li> <li>• Primary ion energies of 0.5 - 5 keV</li> <li>• Scan area: 10 x 10 mm</li> <li>• Mounting flange DN 63 CF (4.5 ")</li> <li>• With working distance of up to 50 mm</li> </ul>



Pos	Qty	Description
		<p><u>Power Unit for BioJet Molecular Beam Injector:</u></p> <ul style="list-style-type: none"> <li>• High Voltage Power Supply and Scan Unit</li> <li>• Large display with high brightness for permanent status control</li> <li>• The Power Unit can be completely remote controlled: Different computer interface busses are included (IEC 488, RS 232)</li> <li>• Maximum Output Voltage: 5000 Volt</li> <li>• Power: 230/115 V, 120VA, 50/60 Hz</li> <li>• Set of installation and instruction manuals, mounting kit.</li> </ul>
2	1	<p><b>Direct Beam Inlet System for Gas Beam Source, consisting of:</b></p> <ul style="list-style-type: none"> <li>• For Macro-Molecules, Organic and Bio-Materials</li> <li>• Beam injector unit made of Quartz Glass or Metal Container</li> <li>• Up to 500 cc volume</li> <li>• Research grade materials with highest purity</li> <li>• Five reserve systems</li> <li>• Minimal dead space transfer tubes connected via 1 high-precision valves to the beam forming chamber.</li> <li>• Heating facility for capillary is optionally available.</li> </ul>
3	1	<p><b>Heatable and Exchangeable Output Aperture for Material Condensation Prevention</b></p> <ul style="list-style-type: none"> <li>• SEM aperture, exchangeable, Standard Material = Molybdenum</li> <li>• With PBN insulators and K-type thermocouple</li> <li>• With AC-power supply unit (100W), Eurotherm PID- controller, cables, remote control via PC, cables</li> </ul>
4	1	<p><b>Beam Chamber (stainless steel) for Beam Generation and Beam Forming:</b></p> <p><u>The Chamber is equipped with flanges for:</u></p> <ul style="list-style-type: none"> <li>• Direct Beam Inlet System</li> <li>• Mechanical chopper, Sapphire shutter</li> <li>• 2 Differential pumping stages with Vacuum pumps, vacuum gauges, valving</li> </ul>



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		<ul style="list-style-type: none"> <li>• Residual Gas Mass Analyzer</li> <li>• Gate valve</li> <li>• Viewports, Spare flanges: 2 x DN 35CF, 2 x DN 63CF</li> </ul> <p><u>Pumping system for the gas beam chamber, consisting of:</u></p> <ul style="list-style-type: none"> <li>• 2 Oil-free turbo molecular pumps (Pfeiffer TMU 510), pumping speed: 500 liters/sec, with valve, power supply and cable.</li> <li>• 2 Oil-free roughing pumps, including all supplies, valves and conductions</li> </ul> <p><u>Pressure Measurement for preparation chamber:</u></p> <ul style="list-style-type: none"> <li>• Ion gauge with controller and bakeable cable (5m)</li> </ul>
5	1	<p><b>Mass Spectrometer System, consisting of RGA head and controller, with the following specifications:</b></p> <ul style="list-style-type: none"> <li>• Pfeiffer PT 121: Prisma Quadrupole Mass Spectrometer Model QMS 100</li> <li>• Mass Range: 1 to 100 amu</li> <li>• The RGA is prepared for TPD measurements</li> <li>• Temperature Coefficient: &lt; 1% of peak height per degree C</li> <li>• Resolution: &lt; 1 amu wide @ 10% peak height over the entire mass range</li> <li>• Detector Type: Faraday Cup and Channeltron Detector</li> <li>• Sensitivity - amps/Torr (amps/mbar): 2E-4 (1.5E-4)</li> <li>• Min Detection Partial Pressure - Torr (mbar): 3E-13 (4E-13)</li> <li>• Zero Blast Interference at Mass 2: &lt; 100 ppm</li> <li>• Max operating pressure - Torr (mbar): 5E-4 (6.6E-4)</li> </ul>
6	1	<p><b>Personal Computer for BioJet System:</b></p> <ul style="list-style-type: none"> <li>• Pentium PC with at least 2.6 GHz, 512 MB RAM</li> <li>• High-resolution 19" colour Flat Panel Display</li> <li>• 100 GB hard drive</li> <li>• CD, DvD+RW</li> <li>• Intelli-Mouse, advanced keyboard, Laser Printer</li> </ul>
7	1	<p><b>Bench and Bake out Ovens:</b></p>



Pos	Qty	Description
		<ul style="list-style-type: none"> <li>• Stainless steel frame movable and adjustable</li> <li>• Flexible isolating bake out cover and rigid support framework, heaters, bake out control unit HR 10 with timer for max. bake out cycles of 62 hours, bakeable cables.</li> <li>• Power control unit PU 20</li> <li>• 1 x 19" electronic rack with air cooling and electric sockets</li> </ul>

### OPTIONS:

Pos	Qty	Description
8	1	<p><b>Beam Shutter and Optical Chopper for Control and Modulation of the Molecular Beam Flux:</b></p> <ul style="list-style-type: none"> <li>• Beam Shutter made of Sapphire</li> <li>• Optical Beam Chopper with Continuous Rotation</li> <li>• The frequency of the electron pulses can be adjusted continuously from 0 to 250 Hz.</li> <li>• Adaptable to all BioJet Macro-Molecule Beam Injectors</li> <li>• Power Supply with constant or pulsed Beam modes.</li> <li>• Power: 230/115 V, 120VA, 50/60 Hz</li> </ul>
9	1	<p><b>Heating Facility for Direct Beam Inlet System</b></p> <ul style="list-style-type: none"> <li>• Heating Jacket for Glass/Metal Capillary</li> <li>• For Material Condensation Prevention</li> <li>• Power Supply with 230/115 V, 10Amp, 6Volt, 50/60 Hz</li> </ul>

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