
MGC

Thermal Gas Crackers

Oxide Growth

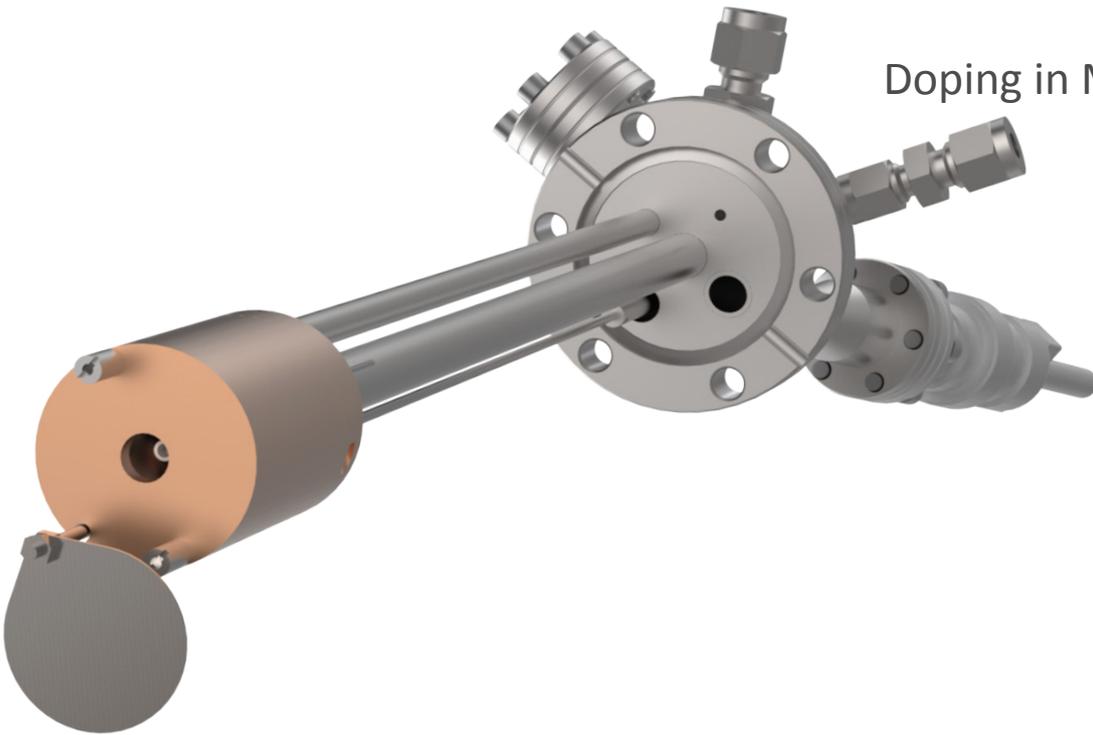
Atomic Hydrogen Cleaning

Surface Science

Surface Passivation

MBE Growth

Doping in MBE



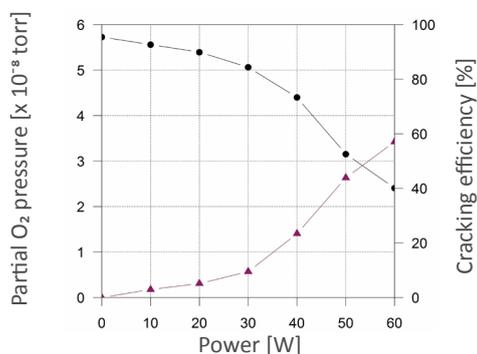
Technical Information

The MANTIS MGC75 source series are highly efficient thermal gas crackers. The instrument uses thermally activated catalytic dissociation to generate ion-free atomic species. The source gas is passed through a hot capillary, where collisions on the hot surfaces lead to a high degree of dissociation. The fine bore capillary is heated from the side by an electron beam using one of the two installed filaments. With this configuration there is no electron impact ionisation and the atomic beam is truly neutral.

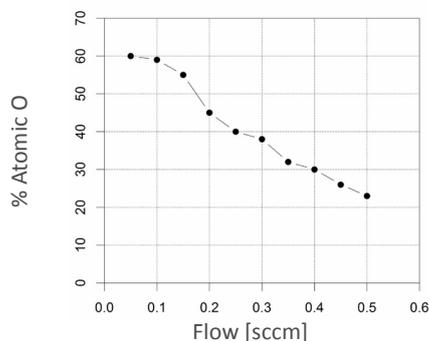
The highly efficient catalytic nature of the instrument enables a low operating pressure ($\sim 10^{-8}$ torr), and requires minimal power (<70W) to achieve substantial dissociation of the gas.

The MGC75 body is directly water cooled to ensure minimal outgassing and heat load of the instrument. A dual filament design allows for continuous operation over long periods without maintenance. Easy exchange of the capillary makes the instrument a universal gas cracker.

The MANTIS MGC75 gas cracker is ideal for use with hydrogen, oxygen and NH_3 . The source is fully UHV compatible, but can be safely operated at pressures as high as 5×10^{-4} torr.

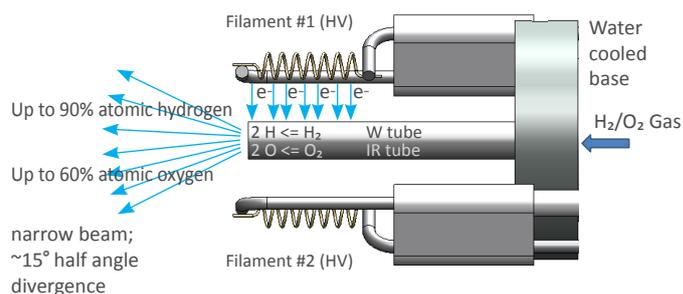


Cracking efficiency of O₂ as function of power.

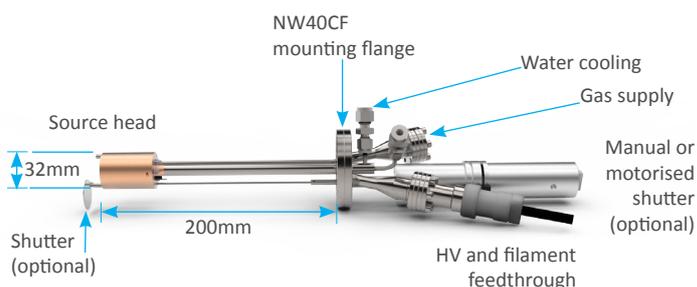


Dissociation of O₂ as function of gas flow.

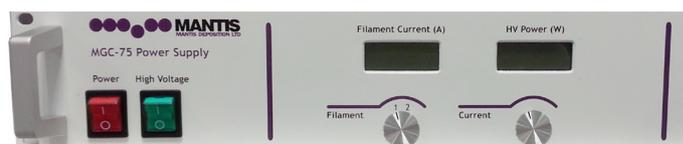
Principle of Operation



Layout Schematics



Mounting flange	NW40CF (2.75" O.D.)
UHV compatible	Yes, bakeable up to 250°C
In-vacuum length	300mm - special length on request
In-vacuum diameter	32mm
Maximum cracking power	75W (typical 30W to 40W)
Gas flow	0 - 1sccm (typical 0.5sccm)
Gas regulation	By MFC or leak valve (optional)
Cracking efficiency	Up to 90% (hydrogen) Up to 60% (oxygen)
Capillary	W (hydrogen) Ir (oxygen)
Beam divergence	Approx. 15° half angle
Filament	W-Filament (2 mounted, 1 spare)
Cooling	Minimum water flow of 0.5 l/min
Cable length	5m
Power supply	Single phase, 100-240VAC, 50/60Hz
Shutter	Integral manual or motorised shutter (optional)



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Surface Science

www.mantisdeposition.com