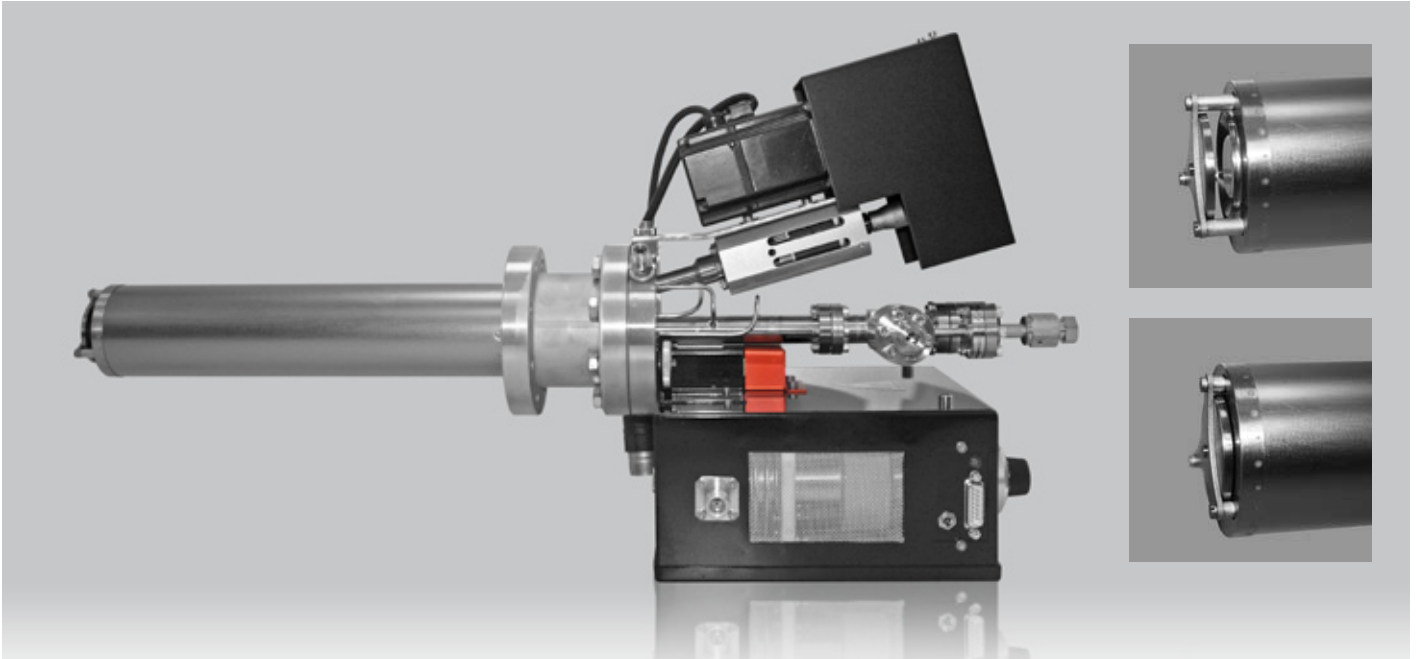


VALVED RF PLASMA SOURCES : VRF

THE ONLY SOLUTION FOR PRACTICAL DILUTE N (CAN BE USED FOR GAN)
DESIGNED FOR NITROGEN AND OTHER GASES



- Patented design providing rapid changes from 0 to 10% in diluted nitride
- Reproducible production of reactive species
- Very high uniformity achieved
- Ideal design for dilute nitride applications
- Ready to use with no plasma stabilization time
- No changing of end pieces required
- Totally eliminates ions and minimizes layer defects

Compared to standard RF Plasma sources, this new source offers **an ease of control** similar to the Valved Cracker cell compared to a standard effusion cell.

While the valve is closed, the source can retain the same working conditions and is ready to use without needing to wait for the start-up and stabilization of plasma as required with the standard RF source.

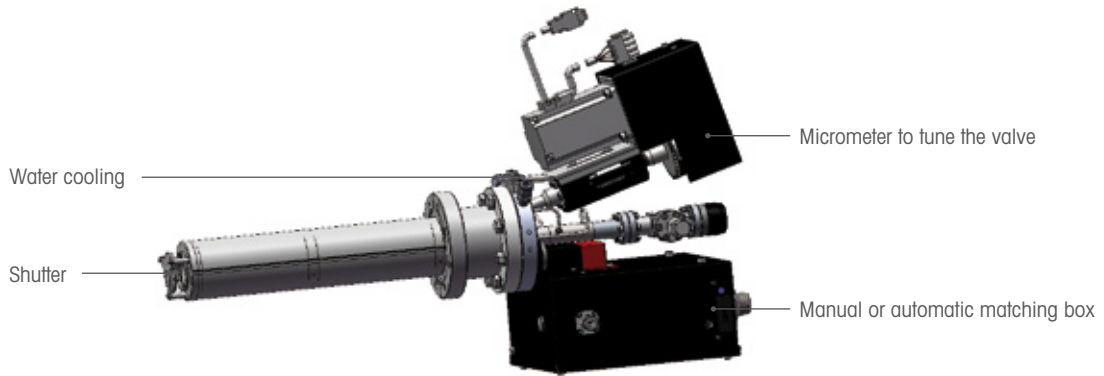
The unique, patented design of the Ribber Valved RF Plasma source makes it a revolutionary atom or radical source providing rapid and reproducible reactive nitrogen species flow modulation and unsurpassed nitrogen concentration **uniformity over large wafers.**

When high uniformity is required over large platens (for production systems), the Valved RF cell offers advantages concerning the working pressure in the chamber compared to other solutions using large diameter RF cells. The molecular nitrogen flow amounts to a **few sccm with the Ribber Valved RF source, versus several tens of sccm with a standard RF source** featuring a large end plate diaphragm.

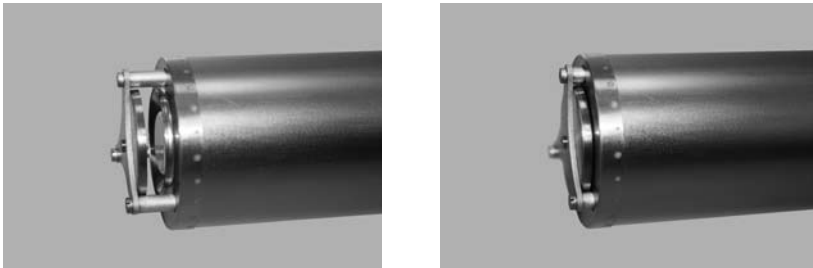
This leads to a **lower operating pressure in the system**, allowing for better process conditions.

SPECIFICATIONS

SCHEMATIC VIEW OF THE SOURCE



VALVES

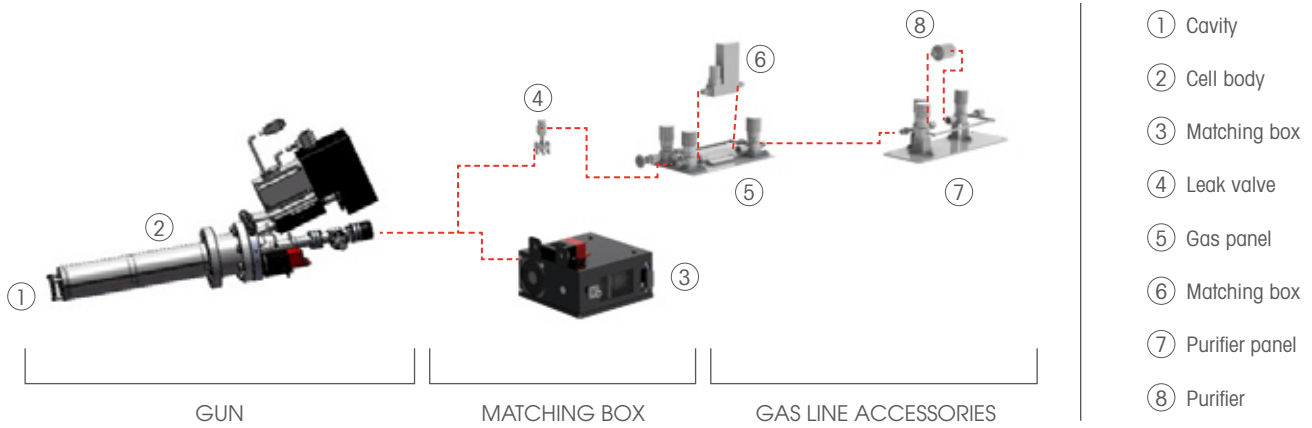


The main characteristic of the VRF-N lies in the use of a valve to control the nitrogen flow. The valve allows for the **variation, adjustment and optimization** of nitrogen flow without needing to change the diffuser model, in contrast to standard RF plasma sources.

CHARACTERISTICS

CELL MODEL	S80 VRF-N-600	S80 VRF-O-6000
Gas load	N2	O2
Cavity Material	PBN	Synthetic Quartz
Mounting Flange (Minimum)	CF 63 (4.5")	
RF Coil Cooling	Yes	
Gas fitting	VCR-¼-F	
Plasma Viewport	CF 16-Viewport	
Power consumption	up to 600 W	
RF Generator	13.56 MHz / 600 Watts	
Power output connector (Match. Box)	RF type N 50W female	
Water connection	Swagelok Ø6 female	
Water flow	DP>2bar / 0.2 l/min	
OPTIONS		
Automatic Matching Box	Yes	Yes
Plasma Light detector	Yes	Yes
Gas Handling	Refer to gas handling chapter	

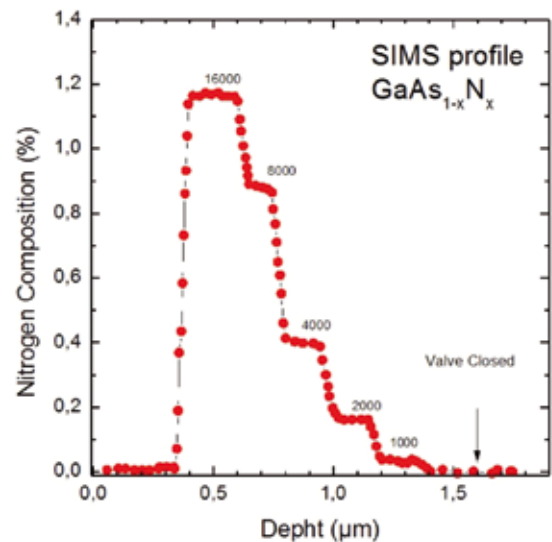
CONNECTION



RESULTS

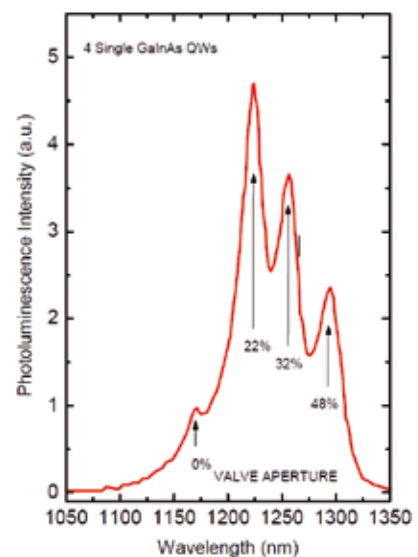
Mechanical control over the useful range of N concentration in GaAsN

This curve shows the ease of control of the Nitrogen concentration in the same GaAsN layer during the same run with no interruption to growth.



Photoluminescence of four single GaInAsN quantum wells.

Plasma was ignited in the buffer layer. The different QWs were obtained with a valve position of 0%, 22%, 32% and 48% respectively along the same run.

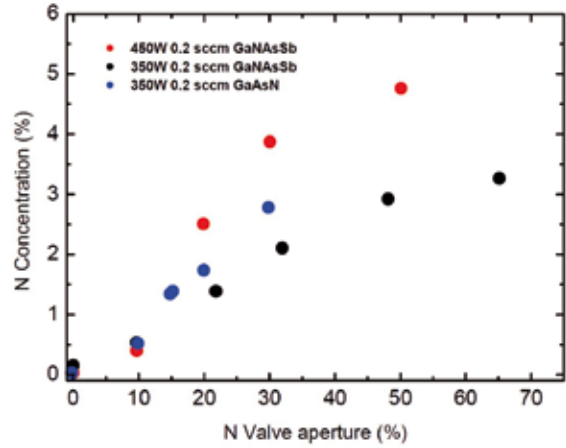


RESULTS

Nitrogen concentration in GaAsN or GaNAsSb versus N valve aperture

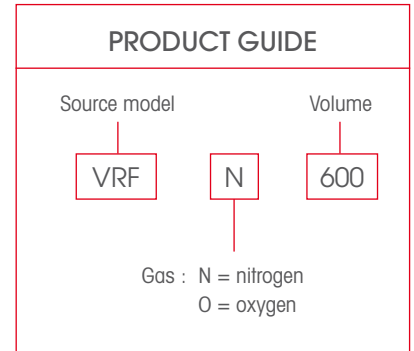
The range of concentration depends on the RF power and the N flow in the plasma cell. A concentration of 7.2% was obtained in GaAsN @ 0.7sccm and 400W.

Reference APL 77, 2482 (2000)



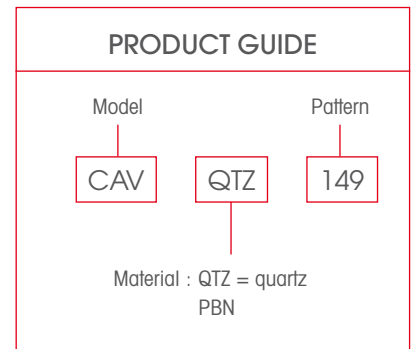
ORDERING INFORMATION

VRF SOURCE



SOURCE MODEL	P.N.	FLANGE	I.V.L.	O.L.	O.D.
S 80 VRF X 600	R235 081 2	CF 63		Please contact RIBER	

CAVITIES



SOURCE MODEL	CAVITY	P.N.
S 80 VRF O 600	40-CAV-QTZ-149	Single piece R330 007 6
S 80 VRF N 600	40-CAV-PBN-149	Single piece R330 071 5

SOURCE SELECTION GUIDE

SYSTEMS	SOURCE MODEL	VRF-N-600
RIBER	MBE 32	
	Compact 12	
	Compact 21	
	EPINEAT	
	MBE 412 (4"/6")	
	MBE 49	
	MBE 6000	
	MBE 7000	
VEECO / VARIAN	GEN II	
	MOD GEN II	
	GEN 930	
	GEN 10	
	GEN 20	
	GEN 200	
	GEN 2000	
VG	V80	
	V90	
	V100	
	V150	
OTHER SYSTEMS		Riber sources are also available for use on systems from Eiko, Anelva, Ulvac, SVTA and DCA, as well as custom.

RECOMMENDED

CONTACT RIBER FOR MORE DETAILS

TECHNOLOGICAL LEADERSHIP

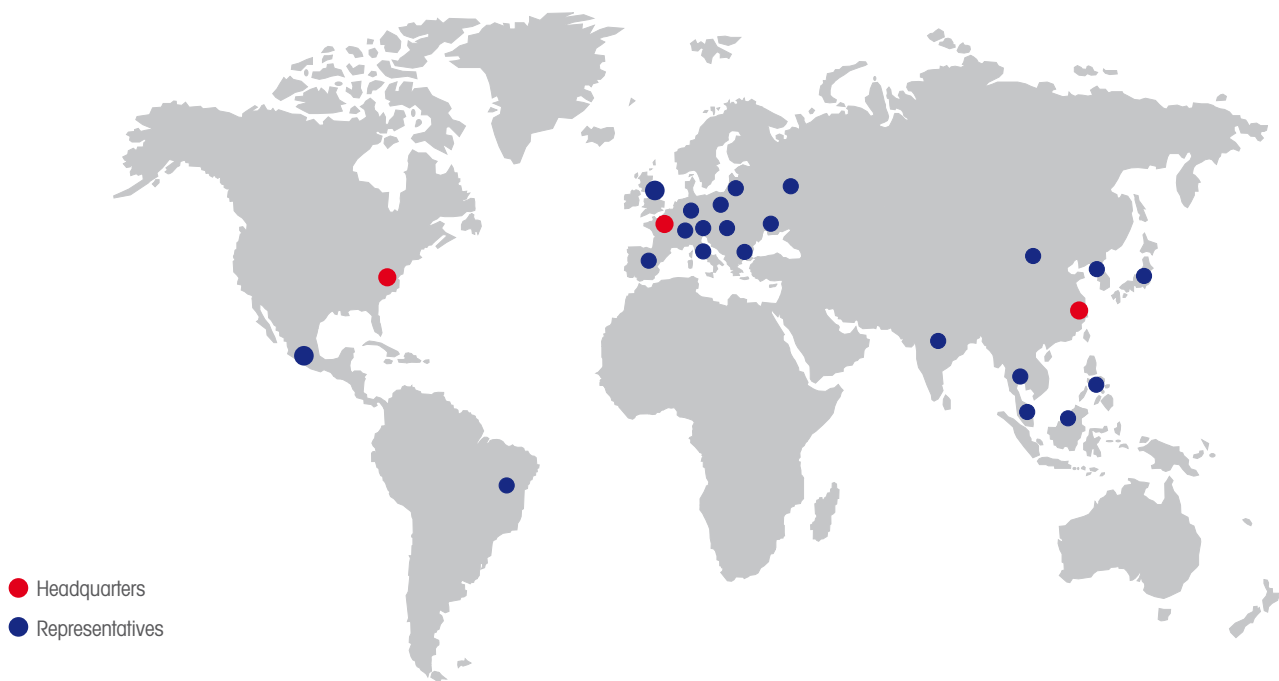
Riber is the world leading supplier of MBE processing equipment and related services.

In total, 750 of our MBE systems have been installed with at least one system in each of the 35 countries with which MBE is involved. This represents 75% of the global market.

Capitalizing on its 30 years of experience, the company's core philosophy is to design systems in close association with customers. Riber has invented and designed major features which are now found in all MBE systems.

Riber plays a key role in the development of MBE technology, providing customers with solutions from equipment to epitaxial growth.

WORLDWIDE PRESENCE



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