

## VALVED ARSENIC CRACKER SOURCE VACS

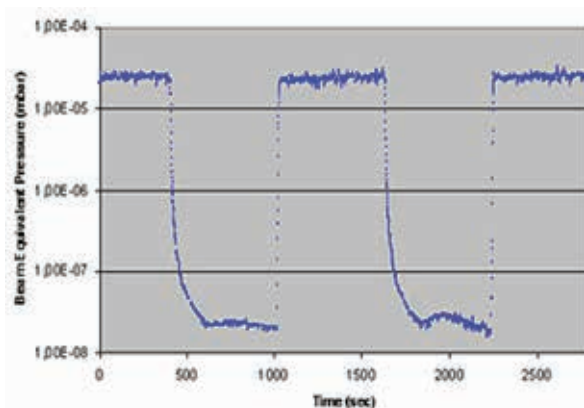
- Crucible capacity 300 cm<sup>3</sup> or 500 cm<sup>3</sup>
- Precise and very fast flux control
- Easy handling and refilling procedure
- Integrated water cooling shrouds
- Large cross-section valve opening
- Compatible with all MBE systems



VACS 100-300 mounted to VADP 100-63 adapter with DN63CF (O.D. 4.5") mounting flange



VACS 40-500-K-M with motor drive and motorized valve control unit MVCU



BEP vs. time, with valve on and off (cell temp. 390°C / cracker temp. 600°C)

The Valved Arsenic Cracker Source VACS is designed for high performance growth of III-V materials.

The VACS is highly specialized for As<sub>4</sub> or As<sub>2</sub> sublimation and combines a large crucible capacity of 300 cm<sup>3</sup> or 500 cm<sup>3</sup> with precise and fast flux control. A flux control range of more than two orders of magnitude is provided by the integrated valve mechanism. The typical on/off ratio is about three to four orders of magnitude. High electron mobilities in AlGaAs / GaAs heterostructures of well above 2 million Vs/cm<sup>2</sup> have been achieved.

The VACS is equipped with a wide angle cone valve mechanism with a large valve opening which allows improved pumping of the As reservoir in open valve position. The wide angle design excludes valve sticking. The valve unit can be operated manually or with a valve control unit (MVCU, see figure on the left) which controls the valve position by an external analogue voltage (0...10 V).

The integrated water cooling shroud and the use of selected materials for cell and valve unit guarantee high purity operation conditions. The operation mode of the source can be easily changed from As<sub>4</sub> to As<sub>2</sub> growth by the operation temperature of the integrated cracker unit.

The special design allows an easy refilling of the crucible from the backside without removing the cell from the chamber. This simplifies your maintenance work and saves your time.

The typical valve characteristic, i.e. the beam equivalent pressure (BEP) as a function of the valve position, is shown on the left hand side. This smooth operation condition guarantees a precise and reproducible flux control for your application. Together with a high motor speed of 10 mm/s a fast control is reached.

## Applications

The VACS is used as As source in III-V MBE. Large crucible capacity (300 cm<sup>3</sup> up to 500 cm<sup>3</sup>). Fast and precise flux control and easy handling for maintenance and crucible refill make the VACS ideal for production MBE systems as well as for higher throughput research MBE systems.

It is well suited to grow high purity AlGaAs / GaAs heterostructures as well as other arsenic containing compounds.

## Adapter VADP

A VADP adapter connects the valved source to the MBE chamber. Design and dimensions will be customized according to your MBE system. The VADP is available with or without integrated water cooling shroud.

## Motorized Valve Control Unit MVCU

The Motorized Valve Control Unit MVCU is designed for operating the valve of a valved source with a servo motor drive. Manual or remote control with 0-10 V analogue input signal is possible. The display indicates the linear position of the valve from 0 - 7.99 from fully closed to fully open position. The resolution is 0.01 mm per step. The automatic zero calibration guarantees a highly reliable and reproducible operation of the valve unit. The MVCU housing is compatible with the 19" rack system.

## Technical Data

Mounting flange	DN100CF (O.D. 6"), with VADP adapter DN40CF (O.D. 2.75") or DN63CF (O.D. 4.5")
Dimensions in vacuum	depend on used VADP adapter and cracking insert
Heating system	cell / cracker: 2 separate Ta-wire heaters
Thermocouple	cell / cracker: 2 type C thermocouples (W5%Re/W26%Re)
Bakeout temperature	max. 250°C
Outgassing temperature	crucible: 500°C; cracker: 1200°C
Operating temperature	crucible: 300-400°C; cracker: 450°C - 1100°C (As <sub>2</sub> -mode)
Cooling	integrated water cooling shroud
Flux control	integrated valve unit
Valve control	hand control (H), or motor drive (M) with control unit MVCU
Crucibles	300 - 500 cm <sup>3</sup> (larger versions on request)

