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Simulation

VTCC

Valved Thermal Cracker Cell



VTCC 40-130-54-KS with integrated cooling shroud and shutter on DN40CF (O.D. 2.75") flange

- Full PBN solution for corrosive materials like Te, Sb, Se, As, Zn and Mg
- DN40CF (O.D. 2.75") mounting flange compatible with all MBE systems
- Thermal cracking up to 1300°C
- 130 cm³ PBN reservoir
- Excellent thermal isolation between low temperature reservoir and hot cracking zone
- Integrated water cooling for cracker stage
- Integrated rotary shutter (optional)

The Valved Thermal Cracker Cell VTCC is a full PBN valved cell with a water cooled cracker stage. The compact design of the cell allows its implementation on the spacesaving DN40CF (O.D. 2.75") flange.

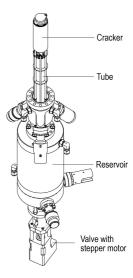
It features a crucible size of 130 cm³ which is sufficient for most R&D applications.

The reservoir heater of the VTCC is designed to perform fast and precise ramps in the temperature range from 100°C to 650°C.

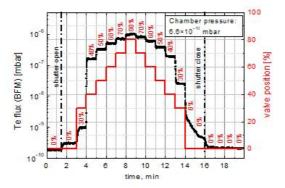
Three independent heating zones for reservoir, valve and cracker allow flexible adjustment of the cell operating conditions.

This, in combination with the full PBN construction of the valve, reservoir and cracker, enables a wide variety of the VTCC applications with the numerous high vapor pressure

The crucible and cracker zones are shrouded by water cooling, minimizing the thermal load on the chamber.



VTCC zones



The VTCC characteristics figure shows the example of the valve calibration, performed with Te. The valve demonstrates wide dynamic range, allowing precise flux adjustments in the % range of the maximal material flux.

The flux is reduced by about 5000 times when the PBN valve is closed. The VTCC may be equipped with the optional integrated shutter, with can be used to reduce the material flux even further.

The VTCC has excellent thermal insulation between the low temperature reservoir and the hot cracking stage.

Application

A source concept like this is used for high vapor pressure materials, which form atom clusters. Typical evaporation elements are As, Se, Sb, Te, Zn and Mg.

Technical data

General

Mounting flange DN40CF (O.D. 2.75")

In-vacuum length L 287 mm In-vacuum maximum total length TL 307 mm Maximum airside length OL 507 mm In-vacuum diameter D 36 mm Maximum airside radius AR 134 mm Shutter distance DS 15 mm Shutter opening angle 90° ccw Bakeout temperature 200°C 30-90 l/h Cooling water flow Weight 15 kg Maximum chamber pressure 10⁻⁵ mbar

Reservoir

Heater typeTa wire filamentThermocoupleNiCr/NiAl (type K)Operating temperature100°C - 650°COutgassing temperatureUp to 700°C

Cooling Integrated water cooling shroud

Crucible capacity 130 cm³
Crucible material PBN

Tube / Valve

Heater type Ta wire filament

Thermocouple W5%Re/W26%/Re (type C)

Operating temperature200°C - 800°COutgassing temperatureUp to 850°CCoolingNoneTube materialPBN

Cracker

Heater type Ta wire filament

Thermocouple W5%Re/W26%/Re (type C)

Operating temperature 300°C - 1200°C
Outgassing temperature Up to 1300°C

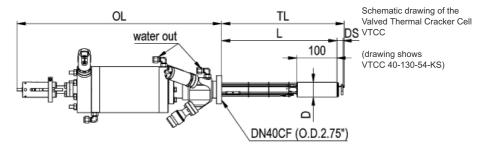
Cooling Integrated water cooling shroud

Cracking insert material PBN

Crucibles

The crucible material suitable for most evaporants is PBN. Please refer to the $\underline{\text{Selection Guide}}$ or inquire for detailed recommendations. For information on crucibles see $\underline{\text{Crucibles}}$.

Dimensions



Specific data

For general information on CF mounting flanges see Flange and Gasket dimensions.

Product	CF flange	Nominal capacity	Lip diameter	Cooling	Shutter *	UHV dimensions ***		max. Power / Current	Power supply	Crucible
		[cm³]	[mm]			[mm]/[mm]		[W]/[A]	Product code	Product code
							R	eservoir 400/8	PS 60-10	
VTCC	40 -	130 -	54 -	K	S-	L287D36		Valve 100/5 Cracker 150/8	PS 36-12 PS 36-12	PBN 130-54

rotary shutter possible on same flange

Product code: e.g. VTCC 40-130-54-KS-L287D36

is a Valved Thermal Cracker Cell on DN40CF-flange for an 130 cm 3 crucible (lip Ø 54 mm), with integrated water cooling shroud, shutter, PBN crucible, in-vacuum length 287 mm and outer diameter 36 mm.

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Oxygen Atom Beam Source OBS mbe systems molecular beam epitaxy Oxygen Resistant Effusion cell OREZ point source SCU solar cell manufacturing CIGS source SUSI-D RTP Crucibles CRU transfer rod in-situ Standard Electron Beam Evaporator

UHV length L=287 mm