Plasma Consult

PlasCon HCD 13.56 MHz Hollow Cathode System

Fig. 1: PlasCon HCD

System layout

The ***PlasCon HCD*** consists of:

1. **plasma source**
   incl. precursor distribution,
   case and top of the vacuum chamber

   top of the vacuum chamber

   - cylinder, made of aluminum, inside diameter: 250 mm
   - integrated water cooling system
   - vacuum pipe connection
   - ventilation valve connection
   - special flange for insertion of the plasma source
   - integrated drillings and connections for the precursor feeding
   - 5 DN 40 ISO KF-flanges for process control and plasma diagnostics
   - accessories

   rf-plasma source

   - JetMatrixPlasmaSource with 48 plasma jets arranged in a planar, hexagonal matrix of 12 cm diameter
   - body of the plasma source made of aluminum
   - integrated water cooling system
   - integrated gas feeding for primary gas
   - max. power 700 W
   - integrated precursor distribution

2. **substrate holder**
   incl. case, electr. lifting device and
   bottom of the vacuum chamber

   bottom of the vacuum chamber

   - cylinder, made of aluminum, inside diameter: 250 mm
   - integrated water cooling system
   - special flange for insertion of the substrate holder
   - flange DN 100 ISO to vacuum pump
   - pumping ring around the substrate holder

   substrate holder

   - material: aluminum
   - diameter: 125 mm
   - integrated water cooling system
   - biasable with 13.56 MHz, max. 300 W
   - electr. lifting device with safety lock

3. **plasma source rf generator**
4. **substrate holder rf bias generator**
5. **pumping system**
6. **measure and control system**
7. **gas flow controller**
8. **system frame and case**

TECHNICAL NOTE

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optional:

9. **chemical oil filter for the pump**
10. **8 gas channels**
    instead of 4 (= standard)
11. **extension of the gas flow system by 2 additional gas pipes for gas purging**

Modes of operation

Different modes of operation are possible.

Tab.1:

Mode	HCD Plasma Source	rf-substrate holder	Gas
1	rf-powered	rf-power off	a..carrier gas b. carrier gas + crg
2	rf-powered	rf-powered a. low b. high, forming secondary plasma	a..carrier gas b. carrier gas + crg
3	rf-power off	rf-powered high, generating plasma	a..carrier gas b. carrier gas + crg

carrier gas: chemically non-reactive gases (e.g. Ar, He,…)
crg: chemically reactive gases

Based on the different modes of operation a large variety of plasma processes is possible.

Tab.2:

Mode	Process
1b. 1b. 1b. 1b.	Surface modifications Plasma etching Plasma polymerization PE-CVD
2a. 2b. 2b.	non reactive ion etching reactive ion etching PE-CVD
3a. 3b. 3b.	non reactive ion etching reactive ion etching plasma polymerization

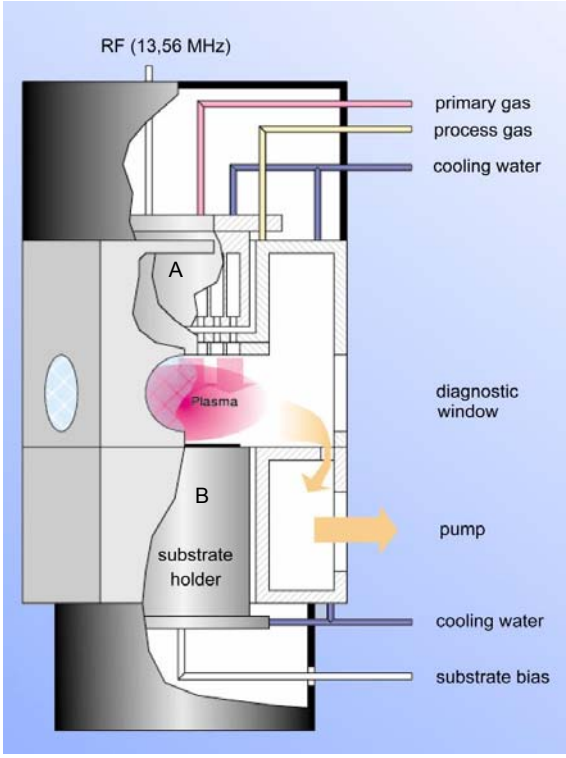

Fig. 2: schematic cross-section

Fig. 2 shows a schematic vertical cross section where the plasma source and an rf-biasable substrate holder form an integral part.

A: Planar HCD plasma source. 48 jets arranged in a hexagonal matrix of 12 cm diameter.
B: rf-biasable substrate holder, accommodates wafers of up to 5” diameter.

The chambers outer dimensions are:

Height: 30 cm
Diameter: 30 cm
Distance: plasma source - substrate holder: 6 cm standard

Plasma Consult

JE PlasmaConsult GmbH
Rainer-Gruenter-Str. 21, Geb. FN
42119 Wuppertal
Germany

Tel. ++49-202-28397-0
Fax ++49-202-28397-123

contact@plasmaconsult.de
www.plasmaconsult.com