

PlasmaCone®

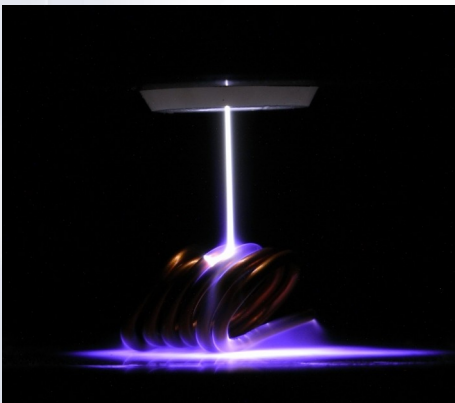
licensing opportunity:

Invention



PlasmaCone, top view: inner copper cone with electrical contact, black cylindrical body, blue gas supply lines, near bottom right gas supply there is an electrical connector of integrated grounded electrode.

Applications



PlasmaCone, side view, beam mode; a copper coil is placed on a thin glass plate which covers a metal sheet; metal sheet acts as grounded electrode.

PlasmaCone:

The new atmospheric pressure plasma source.

The **PlasmaCone** can produce a plasma jet as well as a plasma beam. The **PlasmaCone** generates an atmospheric pressure plasma in both cases by a dielectric barrier discharge; to generate a plasma jet the **PlasmaCone** integrated grounded electrode is used, whereas a plasma beam is generated using an external grounded electrode, e.g. the substrate to be treated.

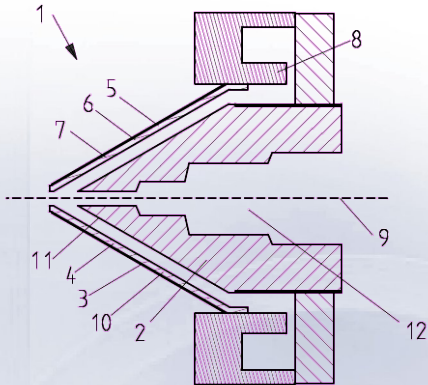
The inventive, unique technical feature of the **PlasmaCone** is a multifunction **coaxial aperture**.

Unique applications:

- **Plasma cleaning** with unique integrated online control via coaxial aperture, e.g. by optical methods
- **Plasma treatment** particularly of (textile) fibres unique in coaxially feeding material to the plasma jet or plasma beam
- **Plasma assisted deposition**, locally confined and/or sequential, unique in feeding material through coaxial aperture
- **Laser plasma hybrid treatment** unique in coaxial optical axis and plasma beam or plasma jet
- **Spectroscopic analysis of specimens** by plasma activated ionisation spectroscopy (PAIS)
- **Plasma cleaning with integrated online process control** via coaxial PAIS; online analysis of contamination without breakdown of substrate
- **Plasma treatment with integrated online process control** via coaxial PAIS

PlasmaCone®

Technical Details



PlasmaCone, sketch; key-elements: inner cone shaped hollow electrode (2), outer dielectric cone (4) with integrated grounded electrode (3).

PlasmaCone: some technical details

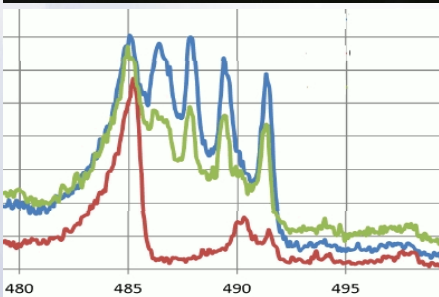
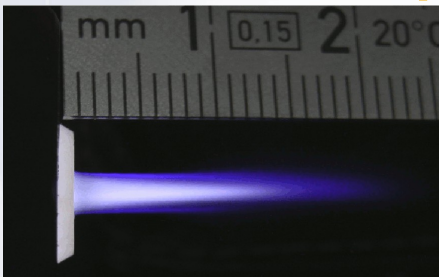
Key-elements of the **PlasmaCone** are:

- Inner cone shaped hollow electrode with coaxial circular aperture
- Outer dielectric cone, integrated grounded electrode with coaxial circular aperture
- Cylindrical/toroidal body (see Nr. 8): effectuates homogeneous gas flow

PlasmaCone can be operated in

- beam mode: plasma is ignited in pure working gas, e.g. Argon, low Argon consumption of about 1l/min
- jet mode, using integrated grounded electrode: higher pressure working gas flow effectuates plasma jet

Proof of Concept



PlasmaCone: First test and application

PlasmaCone was tested with

- Working gas: Argon
- Distance inner electrode – gas outlet (outer cone): 5mm
- Electrical voltage: about 6 kV to 9 kV at 9 kHz to 4 kHz
- Electrical power: about 1 W

PlasmaCone was tested in

- Jet mode, Argon: visible length of jet about 2 cm
- Beam mode: maximum electrode distance 11 mm to 29 mm
- Beam mode, stable beam: electrode distance about 15 mm

PlasmaCone (beam mode) was tested as tool for PAIS with two kinds of specimen containing chlorine – blue and green line, red line is reference.

Patent application filed.

Community trade mark registered.

We are looking for licence partners.