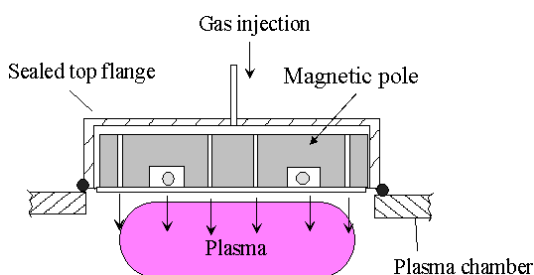


## "Method and apparatus to produce large inductive plasma for plasma processing" and its improvement

### Description

This invention relates to treatment of surfaces using inductively coupled plasma processing and more particularly to the treatment of large flat substrate. Such treatment includes plasma etching, deposition, cleaning or ion implantation.

The plasma generating system produces a time-varying magnetic field and comprises a magnetic core presenting a unipolar pole face and adapted to be used as vacuum seal for the plasma processing chamber. The combination of the magnetic core with an inductor increases and homogenizes the magnetic field and ensures a uniform distribution of the plasma in the chamber. Since the trend to increase the dimension of



the plasma chamber requires increasing thickness of the dielectric window, the use of the magnetic core as vacuum seal is an important advantage.

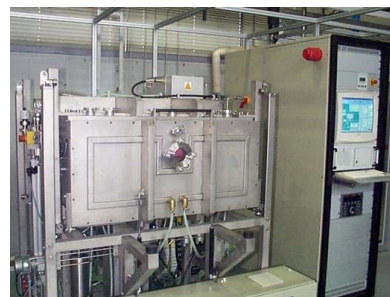
The scaling up of plasma source presents some important drawbacks such as cost of large mono-piece magnetic core or its mechanical resistance, which becomes critical for large piece. To solve this issue, an improvement of the technology consisting in gluing the dielectric window on the magnetic pole was made. This modification solves problems concerning the design, the cost and the efficiency of the plasma source scaling up.

### Innovative aspects and main advantages

- Plasma generation on large planar area
- Uniform distribution of the plasma in the plasma chamber
- Configuration independent of operation pressure and frequency.
- Cost of large plasma source is considerably reduced.
- High mechanical resistance of magnetic pole

### Areas of application

- Reactive ion etching
- Cleaning and activation of surfaces
- Chemical Vapour deposition
- Glass industry, flat panel displays
- Solar cells production



### Stages of development

1st Patent	Priority date	19/05/1998 EP
	Patent granted	JP3190690 US6321681 EP(A)0908923 CA(A)2279229
	Patent pending	EP(B)020753323 CA(B) 2376059

Improvement patent	Priority date	25/11/2004
	Pending	PCT/056157

Technology is matured, licensed, and open to licensing

### Scientific Contact

Dr. François Rossi  
Joint Research Centre, IHCP  
European Commission - I-21020 Ispra - Italy  
Tel: (+39)0332/785443  
Email address: francois.rossi@jrc.it

### Licensing Contact

Intellectual Property and Scientific Collaboration Unit  
JRC - European Commission  
B-1049 Brussels, Belgium  
Email: JRC-TechTransfer@ec.europa.eu

Reference: file n°2709