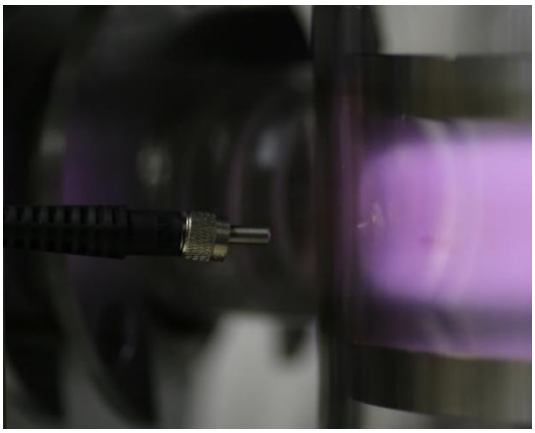
Diagnostic tool for plasma processes

Plasma process diagnostics based on PROES

Invention

Low-temperature plasmas are used in semiconductor and medical technology and surface engineering. Production process precision and production reproducibility are a growing challenge, especially in semiconductor technology, where components are becoming increasingly smaller. A new technology from Ruhr University Bochum specifies process-relevant parameter with PROES (phase resolved optical emission spectroscopy).



The plasma's light emissions are measured with a photomultiplier tube (PMT). The light is transmitted to the PMT through a light conductor. Such a measurement results in a graph showing plasma emission intensity at given wavelengths with a time resolution of a few nanoseconds. This shows when and where there are electrons with certain energies in the plasma, providing information about process-relevant parameters such as flows of ions and radicals.

Advantages of this technology: It is minimally invasive; can be integrated into optical emission spectroscopy (OES) systems, which have little or no time resolution; costs little; and has low susceptibility to optic coatings. Analysis of time-resolved plasma emission provides deeper insights into the process than does standard OES, allowing plasma processes to be developed, optimized, and regulated in a targeted manner.

Commercial Opportunities

Plasma processes are used in a number of applications, including semiconductor technology and surface engineering. The new process from Ruhr University Bochum allows processes to be developed in a targeted manner and monitored during production so that irregularities such as process drift can be quickly identified and corrected.

Current Status

A prototype in the form of a laboratory system has been constructed, and process functionality has been verified. The technology has been registered with the German Patent and Trade Mark Office. It can be registered in other countries in the priority year or upon later PCT registration. We offer interested companies the option of licensing and refining this technology in collaboration with the inventors from Ruhr University Bochum.

An invention of the University of Bochum.

Competitive Advantages

- Easy to integrate into existing structures
- Versatile in use
- Minimally invasive
- Low susceptibility to errors
- Affordable
- High information content

Technology Readiness Level

1 2 3 4 5 6 7 8 9

Technology validated in lab

Industries

- Semiconductor industry
- Surface engineering
- Medical technology

Ref. No.

6520

Contact

Martin van Ackeren
E-mail: ma@provendis.info
Phone: +49(0)208-94105-34

PROvendis GmbH
Schloßstraße 11-15
45468 Muelheim an der Ruhr
Germany
https://provendis.info/en/