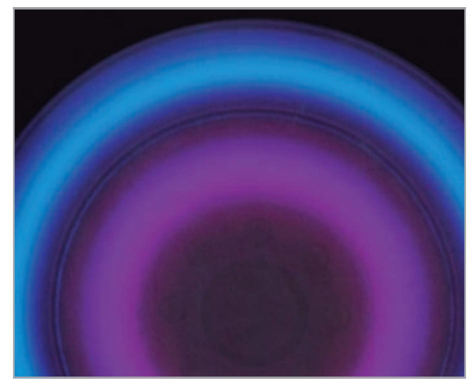
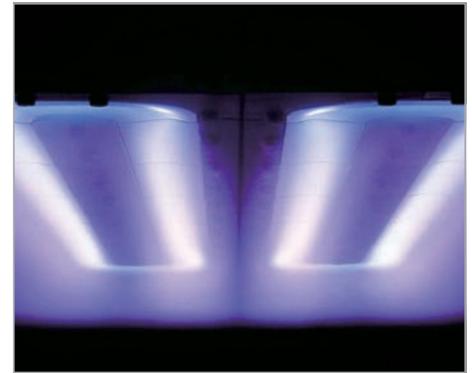




S-PCU
Spectrometric process control unit

Universal tool for optical emission spectroscopy (OES) and plasma process control

Fraunhofer
FEP

Special features

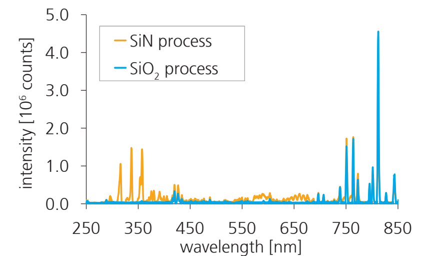
- single and multi wavelength spectrometric process control
- free choice of wavelengths in the range between 300 nm and 1200 nm
- long term stable process control and suppression of process drifts caused by coverage of the light harvesting system, target poisoning and target erosion
- plasma analysis with optical emission spectroscopy (OES)
- OES based development of process control methods for new plasma processes
- high flexibility of the control system regarding very different plasma processes without need for hardware changes

Functions

- measurement, display and data storage of plasma spectra
- process control using plasma emission lines selected by the user
- user defined mathematical calculations using intensity values of different plasma lines to derive the control signal
- fast feedback process control for layer deposition in the transition mode of reactive sputtering processes (very high deposition rate for fully transparent ceramic layers)
- simultaneous control of different process parameters, like reactive gas flow and powering using lines of different plasma species
- measurement and control of up to four different processes or at up to four different positions of an extended plasma process

Applications

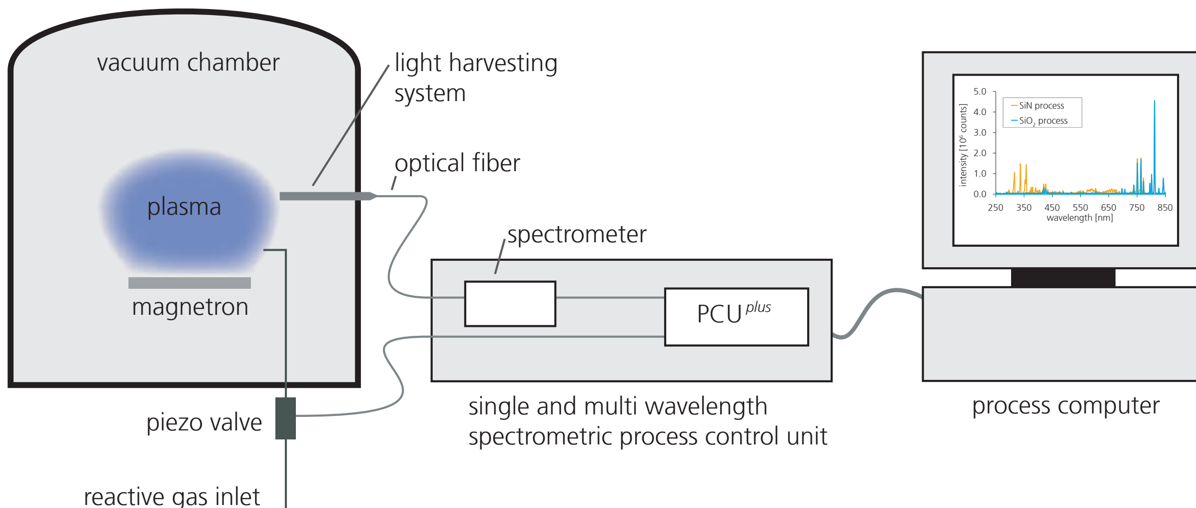
- reactive magnetron sputter processes using electrically conducting targets and reactive gases for high rate layer deposition, e. g. SiO_2, Si_3N_4, Al_2O_3, AlN, TiO_2, SnO, ITO, AZO, ...
- reactive plasma etching processes
- PECVD (e. g. Magnetron-PECVD)



Hard- and Software

- single and multi wavelength spectrometric process control unit including
  - up to four spectrometers for simultaneous recording of plasma spectra at four different processes (to be installed according to user specification)
  - PCU *plus* process control unit with four channel fast feedback process control and mathematical modules
- process computer with software for OES and process control
- adapted light harvesting system with low optical drifts
- interconnections to different relevant hardware components, like piezo valves for reactive gas control and process power supplies

- dimensions: 483 x 178 mm (19", 4 HU)
- ambient conditions: min. 10 °C, max. 45 °C, humidity < 80%
- mains: 230/110 VAC, 1 A, 50/60 Hz



Example: spectrometric process control of the reactive gas inlet for deposition of transparent ceramic layers

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