
Plasma Optical Devices

Technology Opportunities



Pic.1.



Pic.2.



Pic.3.

- ✓ **Plasma optical devices based on permanent magnets for manipulating heavy ion beams:**
 - Permanent magnet Plasma Lens for manipulating and focusing large area moderate energy high current heavy ion beams
 - Axial-symmetric ion cleaning system for activation and etching of substrate surfaces
 - Cylindrical type dc magnetron sputtering system for deposition of functional coatings
- ✓ **Unique features:**
 - Plasma Lens can provide variation of ion dose in the range of two orders in high dose ion implantation facility.
 - The combining of ion cleaning system with magnetron sputtering device provide a single technological process of deposition high quality coatings pure metals and binary compounds onto 3D shaped parts.
 - An inverted dc magnetron sputtering system provides an increased density vapor flow in comparing with dc planar magnetrons (up to 2 times); an increased coefficient of material target usage (up to 70%).
 - Ion cleaning system can be used separately for ion treatment, for example, for liquid crystal alignments

An experimental prototype of a cost-effective ion-plasma technological installation comprising a plasma-optical axially-symmetric device for manipulating ion beams, ion pre-cleaning of substrate surfaces, and an inverted cylindrical magnetron sputtering system for coating deposition on shaped parts was designed, developed and manufactured.

Explanations to pictures

- Pic. 1 - The permanent magnet plasma lens.
Pic. 2 - Pilot sample of axial-symmetric ion cleaning system .
Pic. 3 - Cylindrical type magnetron sputtering system.

Technical Efficiency Improvement

The original and unique permanent-magnet plasma lens for manipulating large-area heavy ion beams in a high dose ion implantation facility was created and tested at LBNL, Berkeley, CA, USA. The developed devices provide ion-plasma pre-cleaning of substrate surfaces and deposition of high quality functional coatings onto round substrates in a single processing cycle

Business Opportunities

The developed d.c. ion-plasma devices allow reactive deposition of binary chemical compounds (nitrides, oxides, carbides) with nanostructures which are of interest for basic and applied investigations in nanophysics and nanotechnologies, and, for example, can be used for creation of anilox rolls which are used widely in the printing and textile industries.

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