Nanostructured surfaces

Technology deposition multiply nano coating using magnetron sputtering devices (systems).

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Ion-plasma spraying material in a vacuum is widely used in the technology of forming fine sub-micron and nano films for low resistance contacts and interconnects multi-wiring (MRS) to reduce working pressure to improve purity and process layers and high speed dispersion used electric and magnetic fields that greatly intensify and localize the plasma spray directly in the area of target material.

One of the main directions of improvement of the current MPC design is the creation of effective cathode unit cooling deionized water erosion zone extended target, ie providing efficiency target material, a significant reduction in size and weight, improve process performance (speed deposition with high uniformity)**[1].**

Analysis of modern methods of magnetic sputtering showed that the most effective solution to the problem of achieving through the use of materials with rotating magnetic unit provided the formation of such density plasma region, which provides a uniform erosion of the target material across its surface.

Therefore, to ensure a sustainable steady state plasma region it should always be closed and have a constant width. The expression for the center line, which determines the optimal configuration of the plasma region is as follows.

(1)

This dependence describes an involute radius in polar coordinates (2.4) with the initial value of the polar angle . Parameter involute varies and is determined experimentally, depending on the diameter and material of the spray target.

In such a design developed in the interior of the magnetron cathode unit block rotation of the magnetic permanent magnet cooling conducted using deionized water, ensuring a constant temperature and resistivity (). The design of the magnetron moves deionized water in a cathode node in a strong stream in which the water receives increased property for thermal transfer and thus provides an effective and uniform sputtering target cathode and cooling the entire site.

The flow of deionized water fed under pressure into the cavity of the cathode through the junction flange, falls on the sheets holder magnetic system and results in rotation of all the magnetic unit with the set speed. This rotation of the magnetic field at the target is moving spray zone erosion plasma on the target surface, allowing you to rapidly and consistently spray the surface**[3]**.

Fig. 1. Instrument

This process ensures that the target erosion zone extends by 25-35% and significantly reduces its thermal load. This ensures a significant increase in utilization of target material (60-70%) with high speed uniformity of dispersion. Cut thickness condensed films on silicon wafers with a diameter of 150 mm while rotating to instrument (Fig. 1) is not exceeded **[2]**.

It is based on the entire complex has been implemented technological route and interconnect formation channels for GaAs-based system LSI that offers high operational reliability and reproducibility of LSI structures based on *Si* and *GaAs* (Fig. 2).

Fig. 2. Relief, a phosphorus-doped polysilicon through a mask photoresist.

Conclusions.

1. A set of studies on the use of magnetron sputtering devices in gallium arsenide nano micron VLSI.

2. A physical and technological analysis of deep and shallow levels in the band gap of gallium arsenide and on this basis the role of chromium in gaining semi-insulating and-GaAs.

References :

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