
Hybrid HIPIMS power supply and plasma ion implantation and deposition (Invited talk)

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Abstract

HIPIMS is a new technology originated from intensive magnetron sputtering, which is typical of transient impulse glow discharge with high density plasmas induced by higher power pulse and high current of short duration. Under these conditions, hipims can be utilized to fabricate required films and perform plasma ion implantation-deposition. In this talk, several types of hipims power supplies developed by our group will be reported, including conventional high-power pulse mode, DC plus pulse mode, Pulse plus Pulse mode, Pulse based on micro-pulse mode, etc. In order to achieve complicated pulse control, a computer based unit is need. The plasma ion implantation based on hipims has also been conducted to fabricated chromium-based films and diamond-like-carbon films through combining high-voltage pulser with Hipims power supply coupled by matching unit. The CrN films have a dense columnar structure and low surface roughness. The grains in the films are featured by the face-center cubic (fcc) structure with the (200) preferred orientation. An excellent adhesion is achieved with a critical load up to 70 N. The fabricated DLC films demonstrate a low friction coefficient and wear-resistance.

Keywords: hipims, power supply, plasma ion implantation

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