
Plasma Immersion Ion Deposition of Diamond-like Carbon Coatings for Practical Applications (Invited talk)

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Abstract

Southwest Research Institute (SwRI) has been conducting research and developing novel technologies in the areas of plasma surface engineering of materials. One of the technologies is the plasma immersion ion deposition (PIID). In particular, diamond-like carbon (DLC) coatings deposited using PIID have found many practical applications in various industries. Currently, SwRI has established six deposition systems dedicated to the PIID process, some for large quantity of outer surface deposition while others for the inner surface depositions of large diameter pipes of > 75cm x 25m long and small diameter pipes of < 1.8cm x 3m long. Besides the traditional amorphous hydrogenated carbon coatings (a-C:H), a wide range of DLC coatings doped with Si, N, O, F, S, and P have been studied for various applications. In addition to the traditional applications for increased wear resistance and reduced low friction, many other applications of the DLC coatings have been found, where the component requires the surface to be anti-corrosion, anti-erosion, hydrophobic, oleophobic, anti-scaling and anti-fouling. In this presentation, we will briefly discuss the SwRI PIID process and deposition systems. However, the emphases will be on the discussion of the properties of various DLC coatings and the processing methods. Finally, a number of application examples in various fields will be presented.

Keywords: PIID, DLC, hydrophobic, anti, scaling, anti, fouling, longpipes

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