

**The New Type Broad Beam Ion Sources and Applications**

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**ABSTRACT**

The broad beam ion sources of hot filament plasma type have been widely used for modifications of materials and thin films, and the new type intensive current broad beam metal ion source including reactive gaseous ion beams is needed for preparing the hard coating films such as DLC,  $\beta$ -C<sub>3</sub>N<sub>4</sub>, Carbides, Nitrides, Borides etc.. Now a electron beam evaporation (EBE) broad beam metal ion source has been developed for this purpose in our lab. CN film has been formed by the EBE ion source. Study of the CN film shows that it has high hardness (HK=5800kgf/mm<sup>2</sup>) and good adhesion. This method can widely changes the ratio of C / N atom's concentrations from 0.14 to 0.6 and has high coating rate. The low energy pocket ion source which was specially designed for surface texturing of medical silicon rubber was also developed. It has high efficiency and large uniform working zone. Both nature texturing and mesh masked texturing of silicon rubbers were performed. The biocompatibility was tested by culture of monocytes, and the results showed improved biocompatibility for the treated silicon rubbers. In addition, the TiB<sub>2</sub> film synthesized by IBED is being studied recently in our lab. In this paper, the results which include the hardness, thickness of the films and the AES, XRD analysis as well as the oxidation of high temperature and erosion tests will be presented.