

## [II-21] [초청]

# A Novel Large Area Negative Sputter Ion Beam Source and Its Application

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A large area negative metal ion beam source is developed. Kinetic ion beam energy of the incident metal ions yields a whole new nucleation and growth phenomena compared to the conventional thin film deposition processes. At the initial deposition step one can engineer the surface and interface by tuning the energy of the incident metal ion beams. Smoothness and shallow implantation can be tailored according to the desired application process. Surface chemistry and nucleation process is also controlled by the energy of the direct metal ion beams. Each individual metal ion beams with specific energy undergoes super-thermodynamic reactions and nucleation. Degree of formation of tetrahedral  $Sp^3$  carbon films and beta-carbon nitride directly depends on the energy of the ion beams. Grain size and formation of polycrystalline Si, at temperatures lower than 500 deg. C is obtained and controlled by the energy of the incident Si<sup>-</sup> ion beams.

The large area metal ion source combines the advantages of those magnetron sputter and SKIONs prior cesium activated metal ion source. The ion beam source produces uniform amorphous diamond films over 6 diameter. The films are now investigated for applications such as field emission display emitter materials, protective coatings for computer hard disk and head, and other protective optical coatings. The performance of the ion beam source and recent applications will be presented.