Contribution ID: **118** Type: **Contributed**

Characteristics and Low Cost Application Perspectives of Atmospheric Plasma Chemical Vapor Deposition

Friday 22 June 2018 11:50 (21 minutes)

There are two major interests in thin film process development: higher quality thin film deposition at lower temperature conditions, and larger area deposition at lower costs of operation. Plasma-enhanced deposition is very useful both for temperature lowering and large area deposition at lower costs, and in addition, it is known that atmospheric operation of plasma-enhanced chemical vapor deposition (PECVD) could minimize high energy ion bombardment. Therefore, atmospheric pressure (AP) PECVD is one of useful approaches for high quality and low cost thin film processing development.
In the first part of the presentation, AP PECVD processes for various gas flow rates, hydrogen dilutions, plasma source powers, plasma source frequencies, and substrate temperatures will be presented. Two inherent features of AP PECVD are confined discharge and radial gas flow, based on which we have designed deposition tool and experimental methods. Design strategies of deposition tools and processing methods in terms of deposition rates and uniformity will be also discussed based both on experimental results and simulation data.
The second part of the presentation is focused on low cost application perspectives of AP PECVD. Thin film processing using a reactor chamber without a strict control of contamination is usually not appropriate in vacuum-based industries. However, as an alternative approach for the cost reduction in deposition tool production, we investigated process-based method to reduce contamination in a reactor chamber without high vacuum pumping facilities that suffers frequent vacuum-break. We suggest two methods for the reduction of contamination like oxygen inclusion in the thin films as follows: (1) Pre-deposition of thin films on the reactor wall to prevent contamination, (2) and pre-treatment of the reactor wall surface just before the thin film deposition to remove contaminants on the chamber wall. Effective reduction of contamination is demonstrated in both methods, and further perspectives on thin film process development in contaminated environment will be discussed.

Author: BAIK, Seung Jae

Co-author: Prof. HOON-JUNG , Oh (Yonsei University)

Presenter: BAIK, Seung Jae

Session Classification: Plasma Science and Technology

Track Classification: Plasma Science & Technology