

Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Numerical Modeling of Atmospheric Dielectric Barrier Discharge in a Single-hole Spray Structure HYUN-SU KIM, HYUN-SUN HAN, JUN SEOK NAM, CHAN MIN LEE, SANG HEE HONG, Seoul National University, Seoul — A numerical model of the spray-type DBD (dielectric barrier discharge) plasma is developed to understand discharge and chemical characteristics of spray etching plasma for TFT-LCD production. In this numerical work, elementary chemical reactions in nitrogen plasma are included at atmospheric condition to find out the amounts of metastably-excited species which are important factors of the LCD etching process. The calculation domain is limited to a single-hole region among the array of DBD spray holes in the etching equipment, and is represented with a two-dimensional axi-symmetric configuration. This single-hole region consists of discharge and spray regions. In the discharge region, a set of continuity equations of charged particles and metastably-excited species is considered, and Poisson's equation coupled with continuity equations is used for the calculation of electric field. In the spray region, fluid dynamic equations are taken into account for spatial distributions of metastably-excited species. The discharge characteristics depending on operating condition and the spatial uniformity of metastably-excited species are discussed on the basis of calculated results. This numerical study will be further extended to the numerical simulation of the entire DBD spray region with a multi-hole structure.

Hyun-su Kim
Department of Nuclear Engineering, Seoul National University, Seoul

Date submitted: 21 Jul 2006

Electronic form version 1.4