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**Chemical compositions and its moisture barrier performances of the silicon nitride films by R2R PECVD process**Seong-Keun Cho<sup>1</sup>, Tae-Yeon Cho<sup>1</sup>, Juwhan Ryu<sup>2</sup>, Jae-Heung Lee<sup>3</sup>

<sup>1</sup>Korea Research Institute of Chemical tec, Daejeon, South Korea <sup>2</sup>Chungnam National University, Daejeon, South Korea <sup>3</sup>Korea Research Institute of Chemical Tec, Daejeon, South Korea

chosg@kriect.re.kr

Silicon nitride films deposited by PECVD have attracted attention in the fields of semiconductors, solar cell as well a gas barriers for flexible display due to their inherent physical properties. The PECVD silicon nitride films can be represented by a non-stoichiometric chemical formula,  $\text{SiN}_x\text{:H}_y$ , with atomic ratios depending considerably on the deposition process. [1-2].

In this study, we have analyzed the role of the chemical compositions of hydrogenated silicon nitride films ( $\text{SiN}_x\text{:H}_y$ ) on the moisture barrier properties of the  $\text{SiN}_x\text{:H}_y$  / PET structure. The films for moisture barrier were deposited onto PET (Polyethylene Terephthalate) by roll to roll plasma enhanced chemical vapor deposition using a 2.46 GHz microwave power source and a  $\text{SiH}_4/\text{NH}_3$  gas mixture. Bonding concentrations of Si-Si, Si-H and N-H were obtained by FT-IR spectroscopy and moisture barrier properties were examined by differential pressure method. Refractive indices and elemental compositions also measured by spectroscopic ellipsometry and AES (Auger electron spectroscopy). It is shown that there is a strong correlation between the deposition conditions, the chemical compositions, optical properties and moisture barrier properties of the silicon nitride film.

## REFERENCES:

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**Keywords**

SiNx  
PECVD  
Barrier  
FTIR