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The growth of MgO thin films deposited by glancing angle deposition method

Sun Young Park*[1)], Sung Hwan Moon[1), 2)], Joohwi Lee[1)], Jae Hyuk Kim[1, 2)], Tae Wook Heo[1)], and Hyeong Joon Kim[1), 3), 4)]

1) School of Materials Science & Engineering, Seoul National University, Seoul, Korea, TEL: 82-2-880-7378, FAX: 82-2-874-7626, E-mail: *psyoung7@snu.ac.kr
2) Samsung SDI Corporate R & D Center, Gongse-dong, Kiheung-gu, Yongin-City, Gyenggi Province, Korea, 446-577.
3) Professor, Tel: +82-2-880-7162, Fax: +82-2-874-7626
4) Inter-University Semiconductor Research Center, Seoul National University, Seoul, Korea

The glancing angle deposition (GLAD) is the one of useful growth process method to change the geometry of films[1]. In order to study the GLAD method, MgO film was employed. MgO thin film is widely used as a protective layer on the dielectric layer for alternating current plasma display panels (AC-PDPs) because of low sputtering yield, high secondary electron coefficient and good optical transparency[2, 3]. In the actual operation of AC-PDPs, the discharge character is strongly dependent on the microstructure of MgO films[4, 5].

The aim of the present study is to report the effect of flux angle (α) on the properties of MgO thin film. The films were deposited by e-beam evaporator at various flux angle. The thickness of all MgO films was approximately 600 nm for all samples. The MgO thin films were characterized using digital balance, Field Emission Scanning Electron Microscope (FE-SEM), and Atomic Force Microscopy (AFM) observations. The results showed that the GLAD method produces isolated columnar structure and the larger grain size relative to the normal method. These observations were generally attributed to atomic shadowing and adatom diffusion. For these reason the roughness was increased and the density of films was decreased, as the flux angle (α) was increased. Additionally, as the flux angle (α) was increased, the isolated column angle was increased. Isolated column angle measured in present study exhibits good agreement with either tangent or the sine rule[6, 7].

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