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In-Situ Monitoring of Film Thickness and Chamber Condition of Dielectric PECVD Process with Impedance Analysis DAEKYOUNG KIM, SKKU Advanced Institute of Nano Technology, Sungkyunkwan University, Korea, HAEGYU JANG, SKKU Advanced Institute of Nano Technology, Sungkyunkwan University, HEEYEOP CHAE, Department of Chemical Engineering, Sungkyunkwan University — In semiconductor production, PECVD with good reproducibility for a wide variety of film thickness is required. As device size is smaller, an accurate control of film thickness real time control of film thickness is needed. Generally, film thickness is controlled by time. But time control method doesn't know real time thickness of film. Therefore, we investigated real time monitoring of film thickness by using impedance monitoring. The effects investigated in this work include dielectric constants of films, thickness of films in chamber wall, plasma densities, and ion energies on impedance by equivalent circuit models. In the model plasma was modeled with resistors and capacitors. The dielectric film and chamber wall were deposited by PECVD with tetraethylorthosilicate (TEOS-Si (OC₂H₅)₄) and O₂ at 1.5torr and 473K. As parameter of chamber wall put in electric circuit, film thickness was separated from impedance of chamber.

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