

## Atomic Layer Chemical Vapor Deposition and Characterization of Ti-silicate Gate Dielectrics Using Tetrakis-diethylamido Titanium (TDEAT) and Tetrabutoxyorthosilane (TBOS)

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Atomic layer chemical vapor deposition (ALCVD) of titanium silicate nanofilms using a precursor combination of tetrakis-diethylamido-titanium ( $\text{Ti}(\text{N}(\text{C}_2\text{H}_5)_2)_4$ ) and tetra-n-butyl-orthosilicate ( $\text{Si}(\text{OnBu})_4$ ) was studied. ALCVD temperature window in our study was 170–210 °C with a growth rate of 0.8 Å/cycle. We investigated the effects of deposition conditions, such as deposition temperature, pulse time of precursor and purge injection, on the titanium silicate nanofilm growth. Prepared nanofilms were characterized by High-resolution transmission electron microscopy (HR-TEM), energy-dispersion X-ray spectroscopy (EDX), atomic force microscope (AFM), X-ray photoelectron spectroscopy (XPS) and X-ray diffraction (XRD). We also investigated the dielectric constant of nanofilm upon the deposition conditions.