

## Electrical properties of $\text{HfO}_x\text{N}_y$ thin films deposited by PECVD

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Among high-k gate dielectric materials, the  $\text{HfO}_2$  exhibits the high dielectric constant (25~30) [1], large band gap (5.68 eV), large band offset (1.5 eV), and thermodynamic stability on silicon. In this study, we deposited the hafnium oxy-nitride ( $\text{HfO}_x\text{N}_y$ ) film because it shows significant reduction in leakage current density and superior thermal and electrical stability and it also exhibits the increase in crystallization temperature depending on the nitrogen concentration.  $\text{HfO}_x\text{N}_y$  thin films were deposited in the temperature at 500 °C on p-type Si (100) substrates by plasma enhanced chemical vapor deposition (PECVD) method, using hafnium tert-butoxide ( $\text{Hf}(\text{O}^t\text{Bu})_4$ ) as the hafnium oxide precursor. A mixture of  $\text{NH}_3$  (60%) and  $\text{N}_2$  (40%) in volume ratio was used as the reactive gas. In addition, we have also investigated the relationship between leakage currents and structures of the coating layers by the effects of composition and annealing temperature.