RPERTP System Development with a Computational Fluid Dynamics Code Simulator Work

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In semiconductor process, the main study was high-k process and equipment analysis with oxygen or nitrogen deposition gases. But the process temperature is becoming lower than before for the prevention of the Transient Enhanced Diffusion(TED) which is based on the shrunken device design rules. So, the reasonable targets for high-k layer are controllable deposition layer near 1㎚ and stable electrical performance with reliable machine. In this paper we chose and focused on the Rapid Thermal Plasma Enhanced Oxidation which has the meaning of conventional monitoring tool of the machine performance. SiO_2 layer was easily processed and measured by ellipsometer. Development tool of the traditional RPERTP was realized with commercial CFD-ACE+ code. Chamber conditions of real machine were used. The key parameter was Sticking Coefficient (SC). SC contains the meaning of diffusion and adsorption of radical on wafer surface. After the confirmation of the reference SC in simulator, by changing process parameters, the effects were researched. The simulator can be used for current process performance evaluation and development.