

### Realistic and real-time contact hole etch process simulation: 3D-SPEED

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Recently semiconductor field engineers in plasma etching processes have made desperate efforts to deal with anomalous behaviors through simulation such as sidewall bowing, and twisting profile. However, the inherent complexities of this research field make current issues hard to be supported by academic researches, leading to big gaps between industries and academic sides. As an effort to meet great goal toward predictable process, we have developed a 3D feature profile simulator based on experimental data in our previous works, which was named as 3D-SPEED. In this work, multiple material etch simulations are demonstrated on the basis of realistic surface chemical reaction in fluorocarbon/CHF plasma. Furthermore, massive computation and memory issues are one of main issues in these simulations. Finally, we believe that our approach will open a new way to bridge academic research and industrial long-pending trouble in semiconductor research field.