Realistic surface reaction modeling of fluorocarbon plasma etch process

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Recently, sub-10 nm plasma etching technology is confronted by the significant challenge due to the inherent complexities. Most of the related process still rely on empirical knowledge of process engineers in the semiconductor industry. Especially, there are still no realistic surface kinetic models in fluorocarbon plasma for high aspect ratio contact hole etching even though the feature size continues to decrease up to sub-10nm node. In this work, we proposed a realistic surface reaction model for high aspect ratio contact hole etching process in fluorocarbon plasma. Based on two-layer model developed in our previous work, we performed the surface reaction modeling to capture the realistic phenomena in plasma etching process. Finally, we verified our surface reaction model through comparisons with experimental data. We believe that our surface reaction model can be useful to industrial applications toward the sub 10-nm node technology.

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