

## Universal surface reaction model with diffusion effect in plasma oxide etching process

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The high aspect ratio (HAR) plasma etching process is gradually emerging as the most critical step in fabrication process of next generation memory devices. The challenging issues in this process is how to avoid abnormal profiles such as randomly twisting and bowing. Even though there are many reports to find the origin of these phenomena, our knowledge is far from the completed understanding due to the complexities. To address these issues in our previous work, we developed a universal surface reaction model of plasma oxide etching process and verified this model with the published experimental data. This work is to extend our model to consider diffusion effects so that is close to real surface phenomena. Diffusion model proposed in this work is based on experimental data of membrane science and molecular dynamic simulation. Finally, we will discuss new insights taken from our model in HAR etching process.