3D Feature profile simulation for the oxide etching under the pulsed fluorocarbon plasma

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The semiconductor industry has moved on the development of 3D integrated devices. The high aspect ratio contact hole (HARC) etching process in this movement is emerging as a hot issue due to its inherent difficulty. To address this issue, we have developed a realistic 3D feature profile simulation to explain and predict the HARC process using fluorocarbon plasma toward the next-generation device. In this work, the specific numerical models of surface reactions were developed for the HARC process under the pulsed plasma, and integrated with 3D feature profile simulator. The surface model proposed in this work has been verified comparing to the SEM image of oxide etching profile under the pulsed plasma. We believe that this work can be helpful for plasma engineers to understand the HARC process.