

Verification of atomic-scale simulations with experimental data in plasma oxide etching process

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In the semiconductor industry, plasma technologies have been considered as one of the most efficient methods to transfer patterns on a nanoscale device for decades. Current fabrication processes require a tight margin and profile control of nanometer-scale precision, but our understanding of this process is still far from the demands of the engineering field. As a part of an effort to extend our knowledge in this research area, we have performed atomic-scale simulation coupled with molecular dynamics simulations. In this work, we will discuss the detailed experimental aspects to verify these simulation methods including XPS and quadrupole mass spectrometer (QMS). Finally, it is demonstrated that atomic-scale simulation is effective approach to understand the emerging issues in plasma process.