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Effect of plasma nonuniform on etching profile[1] WAN DONG, ZHONGLING DAI, YUANHONG SONG, YOUNIAN WANG, Dalian University of Technology, PSEG GROUP TEAM[2] — With the development of microelectronics industry, atomic layer etching (ALE) increasingly plays an irreplaceable role in realizing higher precision control of etching. In the research, by coupling a fluid/MC model with a trenching model, we simulate the ALE cycle in Ar/CF4 and Ar capacitively coupled plasmas, in which four steps are involved. For the first step in an Ar/CF4 plasma, fluorocarbon (CFx) film is deposited by the CFx radicals. Secondly, we simulate the process of purging the residual gas. The third step is about the Ar positive ion bombardment on the fluorocarbon (CFx) layer in Ar plasma; In the last step the residual gas is removed. Based on the two-dimensional fluid model coupled with ion MC model, the parameters of etching, for example the particle densities as well as electron and ion energy distributions, are utilized to simulate the etching profiles in the trenching model. Our results show that the etching profiles and etching uniformity can be improved with the etching rate increasing by changing the bias voltage waveform as well as the ion bombardment.

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