Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Study on modified surface layer of photoresist employing fluorocarbon ion beam and radicals TAKUYA TAKEUCHI, SHINPEI AMASAKI, KEIGO TAKEDA, KENJI ISHIKAWA, HIROKI KONDO, HIROTAKA TOYODA, Nagoya University, MAKOTO SEKINE, MASARU HORI, Nagoya University, JST-CREST, IKUO SAWADA, SONG-YUN KANG, Tokyo Electron Ltd. — High-aspect ratio pattern etching processes with nano-scale accuracy is desired in such as a contract hole etching for the silicon dioxide that is used as a dielectric passivation layer over MOSFETs. However, photoresist (PR) used in the advanced ArF lithography is not tolerant enough for plasma etching processes. Some kinds of degradation of the PR during etching might cause not only low selectivity, but also the line edge roughness (LER) on the sidewalls of etched patterns. For a highly accurate processing, it is necessary to understand the etch mechanisms of PR and to construct a new plasma chemistry that realizes a nano-scale precise pattern definition. In this research, we employed a plasma beam system to expose active species, i.e. ions and radicals, produced in fluorocarbon plasma to ArF PR, and the modified surface layer of ArF PR was analyzed and discussed. It is expected that the ArF PR surface was modified immediately and C-C graphitic peak appeared following a thin fluorocarbon layer formation and the reduction of C=O binding.

Takuya Takeuchi
Nagoya University

Date submitted: 11 Jun 2010 Electronic form version 1.4