

Abstract Submitted  
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**Student Excellence Award Finalist: Modeling of Deep Reactive Ion Etching of Si under plasma molding in 2f-CCP in SF<sub>6</sub>/O<sub>2</sub>** FUKUTARO HAMAOKA, TAKASHI YAGISAWA, TOSHIAKI MAKABE, Keio University — In large-scale etching used in MEMS fabrication, plasma molding is one of the important issues. In our previous study, the effect of plasma molding on the etch profile was numerically investigated without neutral reaction [1]. In this study, we numerically investigate the feature profile evolution of deep Si etching under plasma molding in 2f-CCP in SF<sub>6</sub>/O<sub>2</sub>, including RIE by ions and F radicals and passivation layer formation by O radicals. In SF<sub>6</sub>(83%)/O<sub>2</sub> at 300 mTorr, the removal of the passivation layer at the bottom corner is strengthened by the distorted SF<sub>5</sub><sup>+</sup> ion incidence under plasma molding. The chemical etching rate of Si layer for F radicals is much higher than that of passivation layer. Thus, when the passivation layer is removed by ion impact, the Si etching is enhanced by addition of F radicals. As a result, this indicates that anisotropy of the etching profile is not achieved especially at the bottom in this condition [2]. In addition, we will discuss the influence of the percentage of the oxygen on anisotropic etch profile.

[1] F. Hamaoka et al., Jpn. J. Appl. Phys., vol. 46, no. 5A, pp. 3059-3065, 2007.

[2] -, IEEE Trans. Plasma Sci., (accepted for publication), Oct 2007.

Fukutaro Hamaoka  
Keio University

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