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# Etching characteristics of ArF and EUV resists in dual-frequency superimposed capacitively coupled $CF_4/O_2/Ar$ and $CF_4/CHF_3/O_2/Ar$ plasmas

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EUV lithography is being developed for patterning process below the 27 nm node. On the other hand, ArF (193 nm) optical lithography is still the workhorse for the volume production of integrated circuits. Photo-resists play a key role in the introduction of the next generation lithography. Therefore, plasma etching characteristics of EUV resists need to be investigated and compared against the etch characteristics of the current ArF resist. In this study, the deformation and etch characteristics of ArF and EUV photoresists were compared in a dual frequency superimposed capacitively coupled plasma (DFS-CCP) etcher systems using $CF_4/O_2/Ar$ and $CF_4/CHF_3/O_2/Ar$ mixture gas chemistry which are typically used for BARC open and $Si_3N_4$ etching chemistry, respectively. Etch rate of the resists tend to increase with low frequency bias power ($P_{LF}$) and high frequency source ($f_{HF}$). The etch rate of ArF resist was higher than that of EUV resist. A detailed mechanism for the observed difference in the etching characteristics of the EUV and ArF resists will be discussed.