

Analysis of Amorphous Carbon Hard Mask and Trench Etching Using Hybrid Coupled Plasma Source

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Abstract : The ArF PR mask was developed to overcome the limit of sub 40nm patterning technology with KrF PR. But ArF PR difficult to meet the required PR selectivity by thin PR thickness. So need to the multi-stack mask such as amorphous carbon layer (ACL). Generally capacitively coupled plasma (CCP) etcher difficult to make the high density plasma and inductively coupled plasma (ICP) type etcher is more suitable for multi stack mask etching. Hybrid Coupled Plasma source (HCPs) etcher using the 13.56MHz RF power for ICP source and 2MHz and 27.12MHz for bias power was adopted to improve the process capability and controllability of ion density and energy independently. In the study, the oxide trench which has the multi stack layer process was investigated with the HCPs etcher (iGeminus-600 model DMS Corporation). The results were analyzed by scanning electron microscope (SEM) and it was found that etching characteristic of oxide trench profile depend on the multi-stack mask.

Key Words : Amorphous Carbon, Oxide, Trench, Etching, HCPs (Hybrid Coupled Plasma source)