

**Effects of Ion Bombardment on Developed  
Photoresist Morphology during Reactive Etch  
Processes for sub 0.25 micron Semiconductor  
Devices**

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The use of advanced resist systems has become necessary for lithography in processing of advanced (sub 0.25  $\mu$ m) semiconductor devices to achieve acceptable image quality. These novel resist systems are more sensitive to both post exposure treatments as well as the ion bombardment component present in reactive ion etch (RIE) processes. We discuss the impact of resist interactions with low energy plasma and morphological changes in the resist profile. In particular, the effects of different photoresist constituents, post develop bake conditions, various RIE steps and RIE parameters in capacitively coupled plasma (CCP), magnetically enhanced RIE (MERIE) and inductively coupled plasma (ICP) systems on resist morphology and the quality of final etched images are presented.