ABSTRACT OF THE DISCLOSURE

CHLORINE CONTAINING PLASMA ETCH METHOD WITH ENHANCED SIDEWALL PASSIVATION AND ATTENUATED MICROLOADING EFFECT

A method for forming a patterned layer within a microelectronics fabrication. There is first provided a substrate. There is then formed over the substrate a blanket chlorine containing plasma etchable layer. There is then formed upon the blanket chlorine containing plasma etchable layer a blanket hard mask layer. There is then formed upon the blanket hard mask layer a patterned photoresist layer. There is then etched the blanket hard mask layer to form a patterned hard mask layer while employing a first plasma etch method in conjunction with the patterned photoresist layer as a first etch mask layer. There is then etched the blanket chlorine containing plasma etchable layer to form a patterned chlorine containing plasma etchable layer while employing a second plasma etch method in conjunction with at least the patterned hard mask layer as a second etch mask layer. The second plasma etch method employs a second etchant gas composition which upon plasma activation forms a chlorine containing etchant species and a sidewall passivation layer forming species. The patterned chlorine containing plasma etchable layer has incident to the second plasma etch method a sidewall passivation layer formed upon a sidewall of the patterned chlorine containing plasma etchable layer. Finally, there is then stripped from the sidewall of the patterned chlorine containing plasma etchable layer the sidewall passivation layer while sequentially oxidizing the sidewall of the patterned chlorine containing plasma etchable layer to form an oxidized chlorine containing plasma etchable material sidewall layer upon a partially oxidized patterned chlorine containing plasma etchable layer while employing a third plasma etch method. The third plasma etch method employs a third etchant gas composition which upon plasma activation forms an oxygen containing oxidizing species.

(FIGURE 1 IS SUGGESTED FOR PUBLICATION)