

ABSTRACT**GAS MODULATION TO CONTROL EDGE EXCLUSION IN A BEVEL EDGE
ETCHING PLASMA CHAMBER**

The various embodiments provide apparatus and methods of removal of unwanted deposits near the bevel edge of substrates to improve process yield. The embodiments provide apparatus and methods with center and edge gas feeds as additional process knobs for selecting a most suitable bevel edge etching processes to push the edge exclusion zone further outward towards the edge of substrates. Further the embodiments provide apparatus and methods with tuning gas(es) to change the etching profile at the bevel edge and using a combination of center and edge gas feeds to flow process and tuning gases into the chamber. Both the usage of tuning gas and location of gas feed(s) affect the etching characteristics at bevel edge. Total gas flow, gap distance between the gas delivery plate and substrate surface, pressure, and types of process gas(es) are also found to affect bevel edge etching profiles.

FIG. 2F