

**METHOD AND APPARATUS TO CONFINE PLASMA AND TO
ENHANCE FLOW CONDUCTANCE**

ABSTRACT

The embodiments of the present invention generally relate to a method and an apparatus to confine a plasma within a processing region in a plasma processing chamber. The apparatus may include an annular ring with a gap distance with the chamber wall at between about 0.8 inch to about 1.5 inch. In addition to the annular plasma confinement ring, the plasma can also be confined by reducing a voltage supplied to the top electrode by a voltage ratio during plasma processing and supplying the remaining voltage supplied to the top electrode at a negative phase at the substrate support and the substrate, if the substrate is present during processing. The voltage ratio can be adjusted by changing the impedances of the substrate support and the dielectric seal surrounding the top electrode. Lowering top electrode voltage by a voltage ratio and supplying the remaining voltage supplied to the top electrode at a negative phase at the substrate support reduce the amount of plasma got attracted to the grounded chamber walls and thus improves plasma confinement. This method of plasma confinement is called impedance confinement. Plasma confinement can be improved by using either the described annular ring, the impedance confinement scheme or a combination of both.

Figure 5C