

RF PLASMA REACTOR WITH HYBRID CONDUCTOR AND MULTI-RADIUS DOME CEILING

ABSTRACT OF THE DISCLOSURE

An RF plasma reactor for processing a semiconductor wafer in a reactor chamber with a multi-radius dome-shaped ceiling and a gas inlet for supplying a process gas into the chamber includes an overhead RF signal applicator near the ceiling for applying an RF signal into the chamber through the ceiling to maintain a plasma of the process gas in the chamber, the plasma having a radial ion density distribution near the plane of the pedestal which is center-high for a greater height of the ceiling above the pedestal and is center-low for a lesser height, the height of the ceiling being intermediate the greater and lesser heights such that the radial ion density distribution is neither center-high nor center-low. In another aspect of the invention, the RF signal applicator has an annular distribution characterized by an effective mean radius, the plasma having a radial ion density distribution with respect to an axis of symmetry of the ceiling which is center-high for a lesser mean radius of the signal applicator and center-low for a greater mean radius of the signal applicator, the mean radius of the signal applicator being intermediate the greater and lesser mean radii such that the radial ion density distribution is neither center-high nor center-low.

Fig. 3