ABSTRACT

PROCESS FOR ETCHING DIELECTRIC FILMS WITH IMPROVED RESIST AND/OR ETCH PROFILE CHARACTERISTICS USING ETCH GAS WITH FLUOROCARBON AND HYDROCARBON GAS

A process of etching openings in a dielectric layer includes supporting a semiconductor substrate in a plasma etch reactor, the substrate having a dielectric layer and a patterned photoresist and/or hardmask layer above the dielectric layer; supplying to the plasma etch reactor an etchant gas comprising (a) a fluorocarbon gas (CxFyHz, where $x \geq 1$, $y \geq 1$, and $z \geq 0$), (b) a hydrocarbon gas (CxHy, where $x \geq 1$ and $y \geq 4$), (c) an optional oxygen-containing gas, and (d) an optional inert gas, wherein the flow rate ratio of the hydrocarbon gas to fluorocarbon gas is less than or equal to 0.5; energizing the etchant gas into a plasma; and plasma etching openings in the dielectric layer with enhanced photoresist/hardmask to dielectric layer selectivity and/or minimal photoresist distortion or striation.

(FIGURE 4)