

FLUOROCARBON MOLECULES FOR HIGH ASPECT RATIO OXIDE ETCH

ABSTRACT

Etching gases are disclosed for plasma etching channel holes, gate trenches, staircase contacts, capacitor holes, contact holes, etc., in Si-containing layers on a substrate and plasma etching methods of using the same. The etching gases are trans-1,1,1,4,4,4-hexafluoro-2-butene; cis-1,1,1,4,4,4-hexafluoro-2-butene; hexafluoroisobutene; hexafluorocyclobutane (trans-1,1,2,2,3,4); pentafluorocyclobutane (1,1,2,2,3-); tetrafluorocyclobutane (1,1,2,2-); or hexafluorocyclobutane (cis-1,1,2,2,3,4). The etching gases may provide improved selectivity between the Si-containing layers and mask material, less damage to channel region, a straight vertical profile, and reduced bowing in pattern high aspect ratio structures.

[Figure 1]