Abstract

HIGH SELECTIVE NITRIDE SPACER ETCH WITH HIGH RATIO OF SPACER WIDTH TO DEPOSITED NITRIDE THICKNESS

A method of etching silicon nitride spacers beside a gate structure comprising: providing gate electrode over a gate oxide layer on a substrate. A liner oxide layer is provided over the substrate and the gate electrode. A silicon nitride layer is provided over the liner oxide layer. The invention's nitride etch recipe is performed in a plasma etcher to anisotropically etch the silicon nitride layer to create spacers. The nitride etch recipe comprises a main etch step and an over etch step. The main etch step comprises the following conditions: a Cl_2 flow between 35 and 55 molar %, a He flow between 35 and 55 molar %, a backside He pressure between 4 and 10 torr; and a HBr flow between 7.5 and 12.5 molar %; a pressure between 400 to 900 mTorr; at a power between 300 and 600 Watts. The etch recipe provides a spacer width to nitride layer thickness ratio of about 1:1 and does not pit the Si substrate surface.

(FIGURE 1 IS SUGGESTED FOR PUBLICATION)