METHOD OF FABRICATING A NITROGENATED SILICON OXIDE LAYER AND MOS DEVICE HAVING SAME

ABSTRACT

A method for fabricating a nitrogen-containing dielectric layer and semiconductor device including the dielectric layer in which a silicon oxide layer is formed on a substrate, such that an interface region resides adjacent to substrate and a surface region resides opposite the interface region. Nitrogen is introduced into the silicon oxide layer by applying a nitrogen plasma. After applying nitrogen plasma, the silicon oxide layer is annealed. The processes of introducing nitrogen into the silicon oxide layer and annealing the silicon oxide layer are repeated to create a bi-modal nitrogen concentration profile in the silicon oxide layer. In the silicon oxide layer, the peak nitrogen concentrations are situated away from the interface region and at least one of the peak nitrogen concentrations is situated in proximity to the surface region. A method for fabricating a semiconductor device is incorporating the nitrogen-containing silicon oxide layers also disclosed.

Fig. 1