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(54) Title: N_2O NITRIDED–OXIDE TRENCH SIDEWALLS TO PREVENT BORON OUTDIFFUSION AND DECREASE STRESS

(57) Abstract

A method for forming an isolation structure in a semiconductor substrate is described. A trench is first etched into a semiconductor substrate. A first oxide layer is then formed with the trench. The first oxide layer is subjected to a nitrogen–oxide gas ambient and is annealed to form an oxy–nitride surface on the first oxide layer and a silicon–oxynitride interface between the first oxide layer and the semiconductor substrate. A second oxide layer is then deposited over the oxy–nitride surface of the first oxide layer. The method and isolation structure of the present invention prevent dopant outdiffusion, reduce trench stresses, allow more uniform growth of thin gate oxides, and permit the use of thinner gate oxides.