METHODS OF FORMING ULTRA-THIN BUFFER OXIDE LAYERS FOR GATE DIELECTRICS

ABSTRACT

A first option is a method of forming an ultra thin buffer oxide layer comprises the following steps. A silicon substrate having STI regions formed therein separating at least one active area is provided. The silicon substrate has an upper surface. A sacrificial oxide layer is formed over the silicon substrate and the STI regions. Oxygen is implanted within the silicon substrate. The oxygen implant having a peak concentration proximate the upper surface of the silicon substrate. The sacrificial oxide layer is stripped and removed. A gate dielectric layer is formed over the silicon substrate. A conductor layer is deposited over the gate dielectric layer. The structure is annealed to form ultra-thin buffer oxide layer between the silicon substrate and the gate dielectric layer. A second option is a method of forming an ultra-thin buffer oxide layer, comprises the following steps. A silicon substrate having STI regions formed therein separating at least one active area is provided. The silicon substrate has an upper surface. A gate dielectric layer is formed over the silicon substrate and the STI regions. A sacrificial oxide layer is formed over the gate dielectric layer. Oxygen is implanted within the silicon substrate. The oxygen implant having a peak concentration proximate the upper surface of the silicon substrate. The sacrificial oxide layer is stripped and removed. A conductor layer is deposited over the gate dielectric layer. The structure is annealed to form ultra-thin buffer oxide layer between the silicon substrate and the gate dielectric layer. **(Figure 1)**