ABSTRACT

IMPROVED SHALLOW TRENCH ISOLATION PROCESS

A new method of forming shallow trench isolations has been achieved. A semiconductor substrate is provided. A first etch stop layer is deposited. The first etch stop layer and the semiconductor substrate are etched to form trenches. A gap fill layer of high density plasma oxide is deposited overlying the first etch stop layer and filling the trenches. The deposition of the gap fill layer is stopped before the planar top surface of the gap fill layer overlying the trenches reaches the level of the top surface of the first etch stop layer bordering the trenches. The gap fill layer is etched so that the gap fill layer overlying the trenches does not contact the gap fill layer overlying the first etch stop layer. A second etch stop layer is deposited. The deposition of the second etch stop layer is stopped before the planar top surface of the second etch stop layer overlying the trenches reaches the level of the top surface of the first etch stop layer. The second etch stop layer is polished down to selectively expose the gap fill layer in areas not overlying the trenches. The exposed gap fill layer is etched away. The second etch stop layer and the first etch stop layer are etched away to complete the STI.

(FIGURE 6 IS SUGGESTED FOR PUBLICATION)