Abstract

METHOD FOR FORMING A SHALLOW TRENCH ISOLATION USING HDP SILICON OXYNITRIDE

A Method for forming a shallow trench isolation using HDP silicon oxynitride. A pad oxide layer is formed on a semiconductor substrate having an active area and an isolation area and a barc layer is formed over the pad oxide layer. The barc layer, the pad oxide layer, and the semiconductor substrate are patterned to form a trench having rounded corners in the isolation area. A liner oxide layer is formed over the semiconductor substrate, and a gap fill layer is formed on the liner oxide layer. An important feature of the invention is that the gap fill layer is composed of silicon oxynitride formed using a high density plasma chemical vapor deposition process. A portion of the gap fill layer over the active area can be removed using a reverse trench mask etch, and the gap fill layer is further planarized with a chemical mechanical polishing process using the liner oxide layer as chemical mechanical polishing stop.

(FIGURE 1 IS SUGGESTED FOR PUBLICATION)