[IV-11]

Effects of TCA Incorporation During Annealing Process on The Properties of Oxygen Ion Implanted Silicon Wafers

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ABSTRACT

SIMOX(separation by implanted oxygen) is one of the leading silicon-on-insulator fabrication technology due to high crystal quality, uniform and reliable thin SOI availability, and compatibility to conventional silicon process. SIMOX fabrication process consists of deep oxygen ion implantation and post implantation annealing. During oxygen implantation, extraordinarily high dose of oxygen is needed to make complete buried oxide layer. And then many crystal defects are induced in surface silicon layer. They should be removed by appropriate annealing process. Although, there have been many crystal defects are induced in surface silicon layer. They should be removed by appropriate annealing process. Although, there have been many research results of reducing the crystal defects and improving the SIMOX quality by improvement of implantation process and/or annealing process, it leaves much to be improved to make use of SIMOX wafer as a ULSI substrate. In this study, the effects of TCA incorporation during annealing step on the SIMOX quality is studied especially focusing on the reduction of dislocation density and heavy metal concentration which are the most typical defects of SIMOX.