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论文

不同栅结构的部分耗尽**NMOSFET/SIMOX**的总剂量辐照效应研究

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摘要 研究了在改性注氧隔离（SIMOX）材料上制备的具有环栅和H型栅结构的部分耗尽NMOS晶体管在三种不同偏置状态的总剂量辐照效应。实验表明在10keV的X-射线总剂量辐照下，器件的背栅、正栅阈值电压负向漂移和漏电流都控制在较小的水平；在2Mrad (SiO2)的辐照下仍能正常工作。研究证实了无论哪种栅结构，对于背栅，PG均为最劣偏置，其次是OFF偏置，而ON偏置下器件受辐照的影响最小；而对于正栅，ON均为最劣偏置。通过拟合计算出了绝缘埋层（BOX，即埋氧）中的饱和净正电荷密度Not和空穴俘获分数α。

关键词 绝缘体上硅(SOI) 总剂量辐照效应 环栅结构 H型栅结构

分类号 TN386.1

Total-dose irradiation effect of partially-depleted NMOSFET/SIMOX with two different gate structures

Abstract Total-dose irradiation effect of partially-depleted NMOS transistors with gate-all-around and H-gate structures fabricated on modified SIMOX was studied. It is found experimentally that back and top gate threshold shifts and drain current is confined to a low level during irradiation. The transistors can work properly under the dose of 2 Mrad (SiO2). It is also confirmed that for the back gate of both gate-all-around and H gate, PG is the worst case; for the top gate, ON is the worst case. The saturated net positive charge density Not and the fraction of hole capture α in buried oxides are calculated by data fitting.

Key words silicon on insulator total-dose irradiation effect gate-all-around structure H-gate structure

DOI:

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