Research Of HfO_2 Film Deposited On SOI Substrate

Kai Tao[1]

[1]Institute of Microsystem and Information Technology ,Chinese Academy of Science
8312 Ion Beam Laboratory,865 Changning Road
Shanghai 200050
PR.China

Much recent research has been conducted on high-K dielectrics because of the need to replace conventional SiO_2 in future MOSFETs. Among the candidates, HfO_2 seems to be one of the most promising materials for its high dielectric constant, large band offset to Si, thermal stability in contact with Si and compatibility with both poly-Si and TaN gate electrodes.

To make a better understanding of ideal MOSFETs, we'll try to deposit HfO_2 film on Si-on-insulator substrates which is able to relax several fundamental limitations of CMOS scaling.

An IBED (Ion Beam Evaporable Deposition) system is used for the preparation of HfO2 films and the SOI structure will be fabricated by SIMOX technology . From the top down to the bottom, the different layers of the final structure are gate dielectric, top Si , buried SiO_2 and Si substrates. In the formal paper, we'll analyse the growth quality, related parameters (such as dielectric constant, crystalline state, interfacial state density, reliability, C-V relation, etc.) of the structure and also discuss the corresponding application on CMOS devices.