

초박막 Si oxynitride의 스트레스에 의한 계면 열화 메커니즘

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Mechanism for stress-induced interface degradations in ultrathin Si oxynitrides

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Abstract : We present a mechanism for stress-induced interface degradations through ab initio pseudopotential calculations. We find that N interstitials at the interface create various defects levels in the Si band gap, which range from the mid gap to the conduction band of Si. The level positions are dependent on the configuration of oxygen atoms around the N interstitial. On the other hand, the mid-gap level caused by Pb center is possibly removed by substitution of a N atom for a threefold-coordinated Si atom in the defect. Our calculations explain why interface state generations are enhanced in Si oxynitride, especially near conduction band edge of Si, although densities of Pb center are reduced.

Key Words : SiO₂, oxynitride, interface trap, charge trap