75-Word Abstract

Specific Structural Factors Influencing on Reliability of CVD-HfO_2

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We report on key issues for CVD-HfO_2 gate dielectric about reliability. 1) Two types of extrinsic defects which lead to a large electrical leakage. 2) Stoichiometric interface due to a Si out-diffusion from substrate. 3) Interface defined by dielectric constant transition which was formed by a diffusion mechanism of Si into HfO_2. Although smaller Weibull slope β due to the k-transition interface is a fundamental problem, the β can be improved by a single layered silicate.