Dopant Penetration Effects on Polysilicon Gate HfO_2 MOSFET's

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Abstract

Effect of dopant penetration on electrical characteristics of polysilicon gate HfO_2 gate dielectric MOSFET's has been studied quantitatively, for the first time. Significant boron penetration was observed at high temperature dopant activation, which degrades not only flatband voltage (V_{fb}) but channel carrier mobility. Surface nitridation prior to HfO_2 deposition can suppress boron penetration along with equivalent oxide thickness (EOT) reduction.