Effect of in-situ nitrogen doping into MOCVD-grown Al_2O_3 to improve electrical characteristics of MOSFETs with polysilicon gate

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The effect of nitrogen doping into Al_2O_3 gate dielectric by MOCVD on MOS device characteristics is described for the first time. The nitrogen doped Al_2O_3 MOS has an interface trap density as low as $4.3x10^{10}$ $cm^{-2}eV^{-1}$ that is a half of the non-doped Al_2O_3 ($1.0x10^{11}$ cm^{-2} eV^{-1}), and has less C-V hysteresis of 39 mV than that of 69 mV of Al_2O_3. These improvements are attributed to nitrogen doping into Al_2O_3, which also improve the corresponding MOSFET characteristics of current drivability (I_{dsat}).