
Improvement of memory characteristics of MIS-NVM device using hydrogenated gate oxide

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In this study, we have applied hydrogenated gate oxide as a blocking oxide film to improve memory characteristics of nonvolatile memory (NVM) devices using metal-insulator-semiconductor (MIS) type. Previous studies have difficulty in securing the high quality electrical characteristics of the gate oxide during the low temperature process. However, in this study, H₂ or NH₃ gas was injected together during the formation of gate oxide, and passivation effect was obtained by increasing Si-H bond. The threshold voltage (V_{th}) gain of about 5 V and the hysteresis characteristic of V_{th} were almost stable at almost 0 V in the case of the TFT using the hydrogenated gate oxide. In the case of the MIS type NVM device, the variation of the flatband voltage (V_{fb}) measured by sweeping from -20 V to +15 V and +15 V to -20 V was also confirmed to have a memory characteristic gain of about 88%.