ABSTRACT

A Novel Analysis Method of Threshold Voltage Shift due to Detrap in a Multi-level Flash Memory

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With the aim of improving flash-memory retention characteristics, we investigated threshold voltage shift (ΔV_{th}) due to charge detrap from tunnel oxide. Accordingly we propose new parameter that can reveal the main origin of detrap (hole/electron) and the detrap centroid. We found that the main origin of detrap changes from holes to electrons depending on the degree of tunnel-oxide degradation. Since the hole detrap increases V_{th} of a programmed memory cell, this V_{th} increase must be considered, especially when designing a multi-level flash memory.