Insights: Publications

Control of Nitrogen Incorporation in Tunnel Oxides Using In-Line Noncontact Electrical Characterization

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Nitridation is often used to improve the durability of tunnel oxides in non-volatile memory devices. The dose and spatial distribution of the nitrogen must be monitored during manufacturing to maintain acceptable intra-lot and inter-lot variations in final device performance. When possible, electrical test methods are preferred over other techniques due to their greater relevance to device performance. In this work, an in-line non-contact electrical test method is used to measure electrical oxide thickness, oxide leakage, and interface charge density of nitrided oxides. This capability provides a near real-time technique for monitoring nitrogen levels in tunnel oxides. The electrical test parameters are correlated with conventional SIMS and reoxidation techniques. A testing methodology is developed that monitors nitridation dose and interface nitrogen concentration.

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