

Current Aspects and Future Perspectives of High-Density MRAM

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Key attributes of MRAM technology are known as non-volatility with high speed and density, radiation hardness, unlimited endurance. A lot of results have been announced for commercial market. And it is anticipated that MRAM will play an important role in future memory market through its unique functional advantages. For high density MRAM as a standalone memory, several issues related with MRAM core cells should be preferentially solved.

The purpose of this study is to test the fundamental technology limit for an actual memory device. Research scope was restricted to only core cell at this stage. After success demonstration of integration process of MTJ and MOS transistor as a core cell unit, our facilities are ready to test the MRAM technology.

The key issues of MRAM technology as a future memory candidate are uniform resistance and switching control for sub-micron or deep sub-micron device size. Resistance and MR are limited by the uniformity of barrier thickness induced by bottom electrode. Switching issues are controllable with a choice of appropriate shape and fine patterning process.

Finally it should be pointed out that controls of fabrication is rather important to realize an actual memory device for MRAM technology