

Recent Development Status of MTJ with TEL PVD EXIM™

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STT-MRAM (Spin Transfer Torque-Magnetic RAM) has been demonstrated in globe with many technical breakthrough as next generation emerging memory this year. Despite the steep demands to use the memory as embedded memory, cache memory, standalone memory, storage-class memory and so on, challenges in process, material, and circuit technology still remain. The author will update the latest development of TEL EXIM™ PVD tools for STT-MRAM p-MTJ stack deposition process.

From device characteristic perspective, major targets are to accomplish small write current, high MR ratio / low RA product, and high thermal stability. The first demand for PVD tools in STT-MRAM fabrication are to set the basis of such properties, as they are highly decided by the engineered stacks and actual PVD processes. Another important aspect of PVD tool is flexibility, to deposit stacks with perpendicular magnetization, and also stacks using unknown future technologies that lie ahead, which makes the Spintronics device more appealing. Finally, depositing complex multi-layer MTJs with stableness, from within wafer uniformity to tool marathon run performance, is essential to take STT-MRAM into high volume manufacturing.

In this presentation, the latest MTJ film properties deposited with high throughput on EXIM™, along with read/write characteristics with patterned MTJ elements will be discussed.