

(총회초청강연)

Nonvolatile Ferroelectric RAM

Past, Present, and Future

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The reapplied ferroelectric thin film device can provide the ideal nonvolatile memory according to the research and developments in recent years.

If the current developments in this field are continued, ferroelectric memory devices could challenge all other types of semiconductor memory devices with promises of practically unlimited non-volatility, repetition, retention, performance, and density.

In the present day of ever-growing number of memory device types for computer, a potential memory device with a possibility of replacing all the currently used electronic memory devices can never seriously be exaggerated.

With development of growth method of thin crystalline ferroelectric film, a multilayer structure of thin ferroelectric film and other materials led to new patented electronic memory devices, FRAM. A new patented structures of ferroelectric capacitors are coupled with silicon semiconductor technology which led to a new memory called ferroelectric Random Access Memory. This new memory device practically has unlimited non-volatility, repetition, retention, speed, and density.

Resulting from available history and data of the materials research record and newer processing methods of obtaining better film qualities, many ferroelectric device patents are continuously registered which can compete with currently-being used DRAMs, SRAMs, EEPROMs, EPROMs, PROMs, and ROMs. Also new corporations are founded to exploit the newly patented ferroelectric devices.

Eventually the competition will make inroad into PLDs, Gate Arrays, and Random Logic Circuits in the future.

An overview of ferroelectric thin film materials that have been used for ferrocaps and FRAMs will be presented here along with past history and future trend. Some of optimum memory cell structures such as shadow memory will be presented at same time.