Testing of Ferroelectric Magnetoresistive and Resistive Random Access Memory Under Reactor Neutron Radiation

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Abstract

New type of non-volatile memory is different from traditional non-volatile memory as it is not depending on charge for storing data. Therefore, the new type of non-volatile memory is considered to have better radiation resistance. This paper mainly evaluates the soft error and hard error resilience of three kinds of non-volatile memory including ferroelectric, magnetoresistive and resistive random access memory. The experimental phenomenon is obtained and the mechanism of neutron radiation effect of three non-volatile memories is analyzed. For MRAM (MR2A16A), there is no soft and hard error during read test and read-write test. And for RRAM (MB85AS4MT), there is no soft error and hard error under static state. For FRAM (FM28V100), soft and hard error are detected during reading process. During reading process, soft error may appear when neutron irradiate at peripheral circuit and hard error may appear when neutron irradiate at memory cell. The difference of memory cells' structure of MRAM, RRAM and FRAM cause the difference in neutron radiation effect.