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The effect of ultraviolet irradiation on data retention characteristics of resistive random access memory. KENTARO KINOSHITA, KOUHEI KIMURA, KOUTOKU OHMI, SATORU KISHIDA, Tottori University — It is getting more and more serious to generate soft-errors by cosmic radiation, with increasing the density of memory devices. Therefore, the irradiation resistance of resistance random access memory (ReRAM) to cosmic radiation has to be elucidated for practical use. In this paper, we investigated the data retention characteristics against ultraviolet irradiation to ReRAM with Pt/NiO/ITO structure. Soft-errors were confirmed to be caused by ultraviolet irradiation in both low and high resistance states. The analysis of irradiation frequency dependence of data retention characteristics suggested that electronic excitation by the irradiation caused the errors. Based on a statistically estimated soft-error rate, the errors were suggested to be caused by aggregation and dispersion of oxygen vacancies due to the generation of electron-hole pairs and valence change by the ultraviolet irradiation.

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