Confined Resistive Switching of TiO2 Dielectrics Resistive Random Access Memory with a nanopore in the TiO2 film created by Focus Ion Beam

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Abstract

TiO2 high-k material has attracted much attention recently because of its reversible resistance switching behavior for resistive random access memory (RRAM) devices. Essentially, low cost, low power, multi-level cell and reliability close to flash are required for RRAM. Efforts to improve density and speed using different metals/dielectrics and device structures have been reported [1-4].The use of FIB to prepare a Pt/nanopored-TiO2/TaN RRAMs and their resistive switching behaviors are demonstrated. With nanopore with an area of 2020~4040 nm2 in the TiO2 dielectric film, the prepared Pt/nanopored-TiO2/TaN RRAMs have a lower forming/set/reset voltage and a more stable data retention behavior as compared to conventional Pt/TiO2/TaN RRAMs.

Keyword：TiO2、high-k material、RRAM、Focus Ion Beam