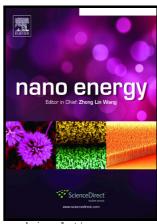
### Author's Accepted Manuscript

Revealing Conducting Filament Evolution in Low Power and High Reliability Fe<sub>3</sub>O<sub>4</sub>/Ta<sub>2</sub>O<sub>5</sub> Bilayer RRAM

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#### **ACCEPTED MANUSCRIPT**

# Revealing Conducting Filament Evolution in Low Power and High Reliability $Fe_3O_4/Ta_2O_5$ Bilayer RRAM

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Keywords: RRAM, Ta<sub>2</sub>O<sub>5</sub>/Fe<sub>3</sub>O<sub>4</sub> bilayer, Conducting Filaments, Low power consumption, Reliability, *in/ex-situ* TEM

#### **Abstract**

In this work, we used the polycrystalline- $Fe_3O_4$  to improve the reliability of the  $Ag/Ta_2O_5/Pt$  resistive random access memory (RRAM). In both the  $Ag/Ta_2O_5/Fe_3O_4/Pt$  and  $Ag/Fe_3O_4/Ta_2O_5/Pt$  structures, the switching properties for these bilayer RRAMs were measured in atmosphere and vacuum environments. The results demonstrated that the humidity would affect the Ag filament formation in different environments, and the  $Ta_2O_5$  and  $Fe_3O_4$  interface

<sup>\*</sup>These authors contributed equally to this work.

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