

## Resistive Switching Characteristics of Resistive Random Access Memory Devices after Furnace Annealing Processes

**Authors :** Chi-Yan Chu, Kai-Chi Chuang, Huang-Chung Cheng

**Abstract :** In this study, the RRAM devices with the TiN/Ti/HfO<sub>x</sub>/TiN structure were fabricated, then the electrical characteristics of the devices without annealing and after 400 °C and 500 °C of the furnace annealing (FA) temperature processes were compared. The RRAM devices after the FA's 400 °C showed the lower forming, set and reset voltages than the other devices without annealing. However, the RRAM devices after the FA's 500 °C did not show any electrical characteristics because the TiN/Ti/HfO<sub>x</sub>/TiN device was oxidized, as shown in the XPS analysis. From these results, the RRAM devices after the FA's 400 °C showed the best electrical characteristics.

**Keywords :** RRAM, furnace annealing (FA), forming, set and reset voltages, XPS

**Conference Title :** ICETM 2017 : International Conference on Electronics Technology and Manufacturing

**Conference Location :** London, United Kingdom

**Conference Dates :** August 21-22, 2017