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

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Abstract : In this study, the RRAM devices with the TiN/Ti/HfO_x/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_x/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
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