Supplementary Information

Reproducible and reliable resistive switching behaviors of AlO_X/HfO_X bilayer structures with Al electrode by atomic layer deposition

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Figure S1. (a) XPS depth profile of AlO_x/HfO_x bilayer on Pt-coated substrate (b) X-ray diffraction patterns of AlO_x/HfO_x bilayer on Pt-coated substrate.



Figure S2. The applied bias pulses for endurance measurement.



Figure S3. I – V characteristics of the OFF and the ON states of bilayer structure device before and after the application of bias pulses. (a) Set process by a voltage pulse with 2 V and 100 ns, (b) Reset process by a voltage pulse with -3 V and 100 ns. (Insets: applied pulses), and (c) set-read-reset-read pulse cycle tests.