

Figure 1. Structural and concentration characteristics of the GeTe/ Sb_2Te_3 superlattice deposited by ALD. (a) Schematic diagram and chemical reactions of the precursors for the ALD GeTe/ Sb_2Te_3 film deposition process. (b) Cross-sectional STEM and FFT image of the thick Sb_2Te_3 and GeTe layer deposited on SiO_2 substrate. (c) Cross-sectional STEM (left), TEM (middle), and EDS (right) image of the alternate GeTe/ Sb_2Te_3 superlattice film. The Ge, Sb, and Te concentration line profile is obtained from the yellow line region marked in the TEM images.

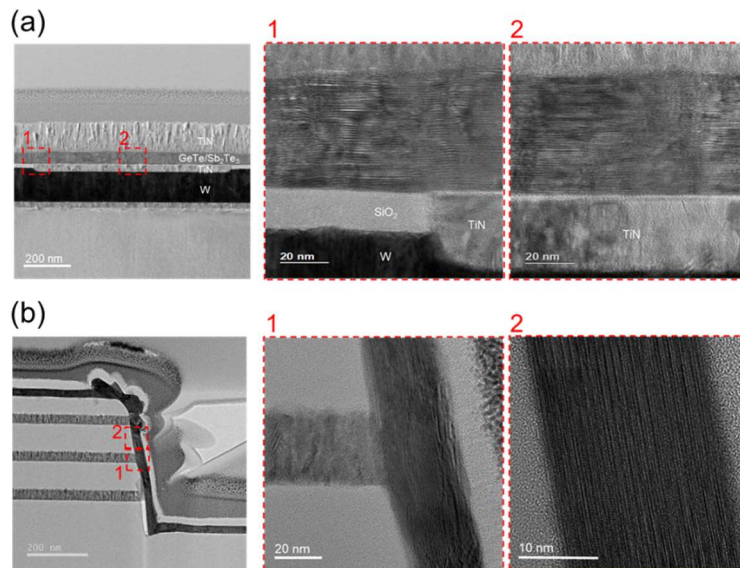


Figure 2. Structural characteristic of the phase change memory devices with the alignment of ALD GeTe/ Sb_2Te_3 superlattice. Cross-sectional TEM images of the ALD GeTe/ Sb_2Te_3 superlattice film on an (a) planar and (b) vertical device. The figures with a red border on the right are higher-magnified images of the local phases indicated by the red box and numbers on the left figure.

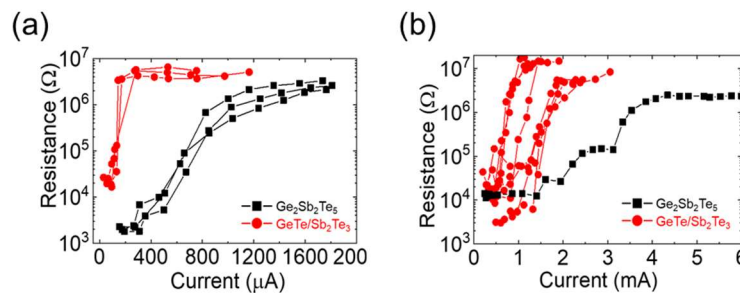


Figure 3. Resistance versus current of the (a) planar and (b) vertical device. Note that the operating area is (a) 80×80 and (b) 500×40 nm^2 , respectively.