Electronic Supplementary Information (ESI)

A Ferroelectric Tunnel Junction Based on Piezoelectric Effect for Non-Volatile Nanoferroelectric Devices

Shuoguo Yuan, Jinbin Wang*, Xiangli Zhong*, Fang Wang, Bo Li and Yichun Zhou

Experimental Section

The Bi$_{3.15}$Nd$_{0.85}$Ti$_3$O$_{12}$ (BNT) target was synthesized by a standard solid-state reaction using high purity Bi$_2$O$_3$, Nd$_2$O$_5$, and TiO$_2$. The BNT thin films were fabricated on Pt-coated silicon substrates using PLD at a substrate temperature of 700 °C in 200 mTorr of oxygen. The laser ablation was carried out at a laser fluence of 2.5 J/cm$^2$ with a repetition rate of 10 Hz using a KrF excimer laser with a wavelength of 248 nm.

The film thicknesses were measured on a Filmetrics model F20-UV and F50-UV. The domain structures, local phase hysteresis loops and amplitude butterfly loops of the BNT films were studied with a Veeco MultiMode-V AFM for the nanoscale polarization detection by PFM (using Pt-coated cantilever at an ac voltage of 1 V with an excitation frequency of 120 kHz). The current-voltage characteristics were measured in the CAFM mode (using Au-coated cantilever) with a scanning rate of 1 Hz.