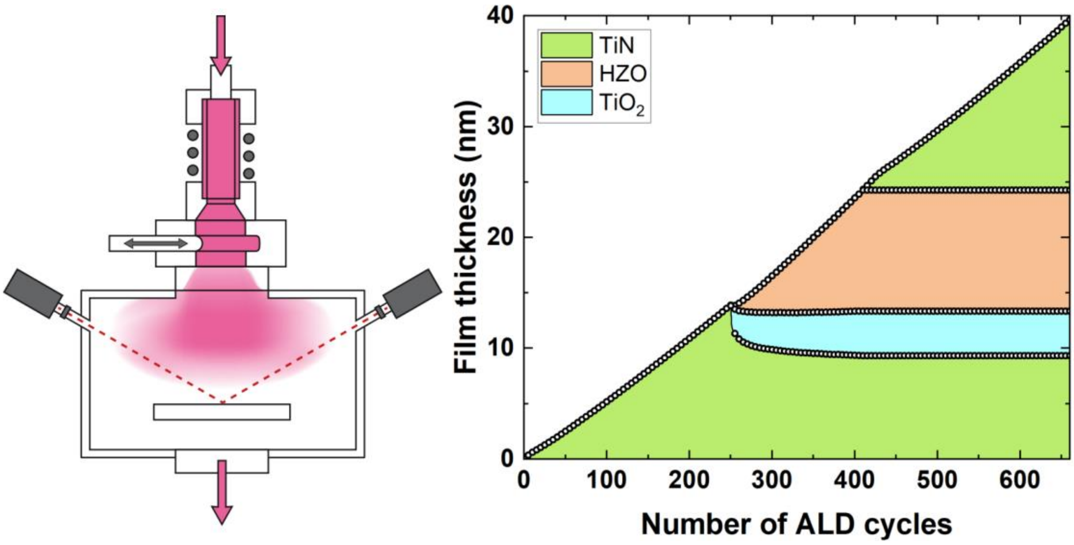

Figure 1: (left) Experimental setup showing the ALD chamber with the in situ spectroscopic ellipsometry (SE) apparatus attached. (right) In situ SE measurement showing the growth of a TiN/HZO/TiN stack being deposited back-to-back. In light blue, the oxidation of TiN to TiO_2 due to ozone exposure used for the HZO growth is shown. In the SE model, the bottom electrode TiN, TiO_2, and HZO were fixed during the growth of the top TiN electrode.

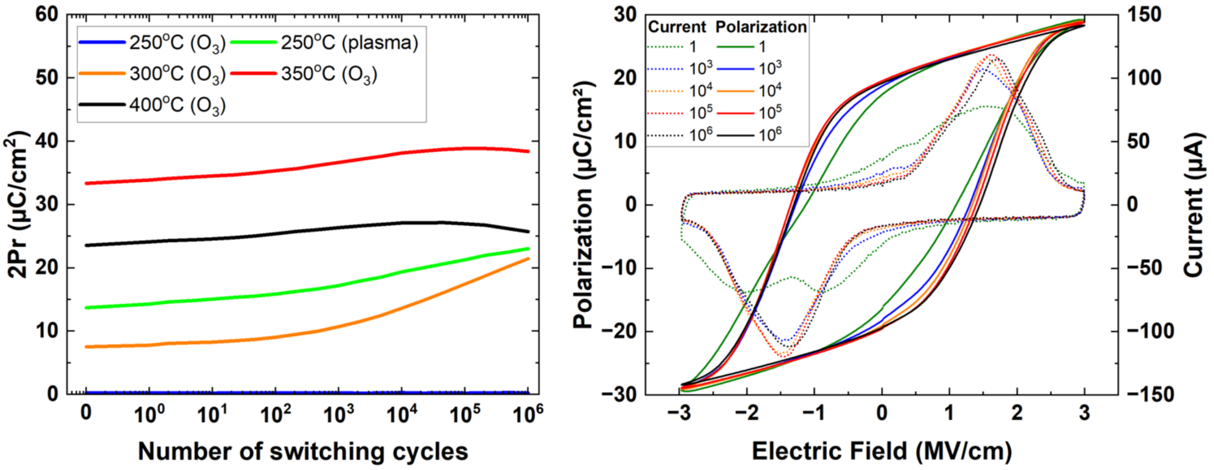

Figure 1: Ferroelectric measurements showing polarization as function of switching cycles on the left, and an example of ferroelectric hysteresis curves showing wake-up behavior on the right. The wake-up behavior is from the sample deposited at a table temperature of 350°C.