TiO_2 target was made by pressing and sintering the high purity rutile power obtained from Sigma Aldrich. The sintering process was done under an oxygen atmosphere (760 mmHg) at ~1000 ^oC for 5 hours. The cubic YSZ target (8-12% Y_2O_3 doped-ZrO_2) was purchased from American Elements Co. We used a Lambda Physik (LPX200) KrF excimer laser machine (λ = 248 nm, τ = 25 ns) to ablate the targets. Our PLD machine is equipped with a multitarget carousel. This enables us to rotate the targets during the deposition to provide a uniform ablation and avoid pitting on the target surfaces. Meanwhile, we do not need to open the chamber and change the targets for multilayer deposition. Si(100) substrates with dimensions of 2 cm by 2 cm was used. The Si(100) substrates were cleaned through a multi-step procedure including degreasing in acetone at 200^oC for 10 min., ultrasonic cleaning in acetone for 5 min. followed by ultrasonic cleaning in methanol for 5 min. The cleaned substrates were fully dried by nitrogen gun and, immediately, loaded into the PLD chamber. The chamber was evacuated to a base pressure of ~1×10^{-6} Torr by a turbomolecular pump backed by a rotary pump. Cubic YSZ buffer layers were deposited at 700^oC, energy density of 3-3.5 $J.cm^{-2}$, and repetition rate of 5 Hz. The laser spot size onto the target surface was about 2 mm by 3 mm. To effectively destroy the native oxide layer on the silicon substrates, the c-YSZ films were deposited for 1000 pulses under vacuum followed by 2000 pulses under the oxygen partial pressure of 5×10^{-4} Torr. Subsequently, TiO_2 thin films were deposited on the c-YSZ buffer layers at different substrate temperatures and various oxygen partial pressures. The energy density, repetition rate, and number of pulses were considered as 3-3.5 $J.cm^{-2}$, 5 Hz, and 6000 for all TiO_2 films. Eventually, the samples were cooled down to room temperature inside the PLD chamber under the oxygen partial pressure of 1 Torr.