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SUPPORTING INFORMATION

MANUSCRIPT:

The effect of oxygen vacancies on water wettability of transition metal based $SrTiO_3$ and rare-earth based Lu_2O_3

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XPS study of Lu2O3 thin-film:

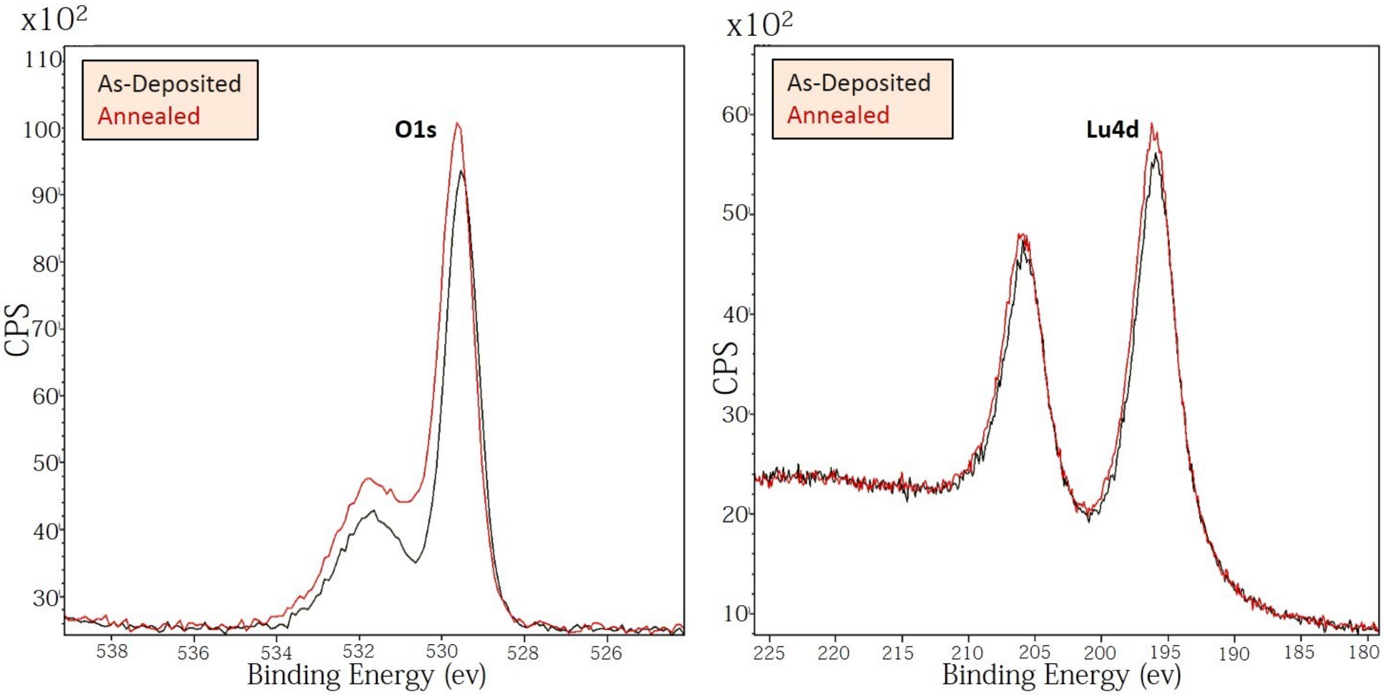


Fig. S1: XPS analysis of Lu2O3 on (a) O1s element and (b) Lu4d element.

XPS study of SrTiO3 thin-film:

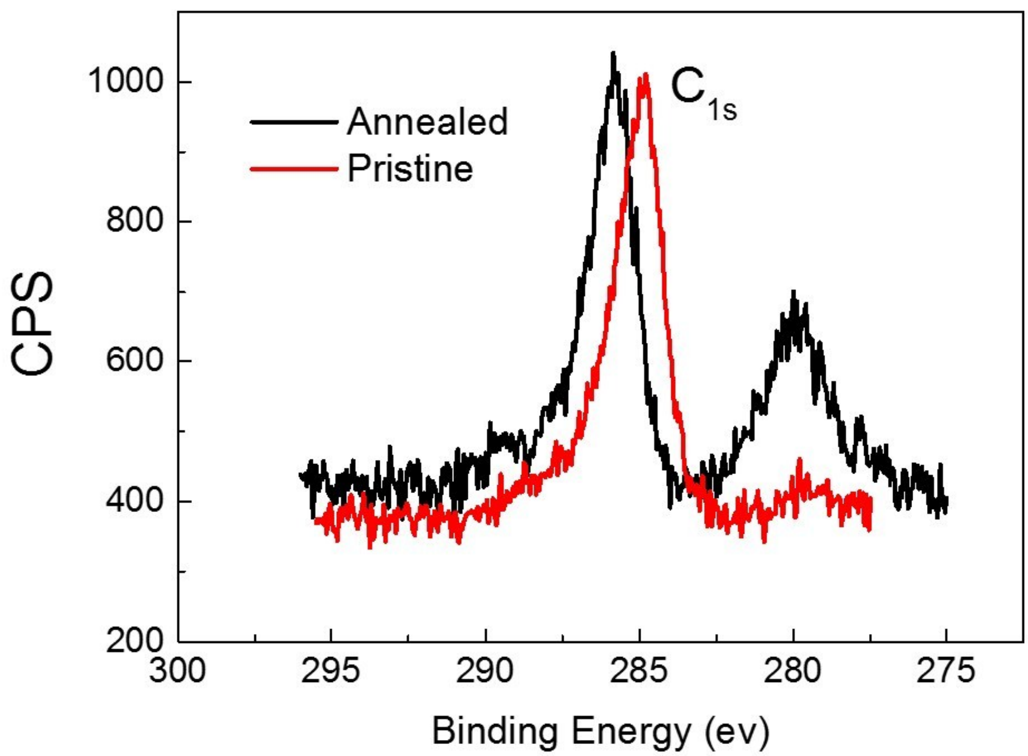


Fig. S2: XPS analysis of SrTiO3 C1s element before and after annealing.

Slight shift in the peak could be due to formation of C-O-C (286nm) after annealing. In Pristine sample the dominated peak is C-C (284.8nm).

Oxygen vacancy and WCA Study of CeO_2 thin films:

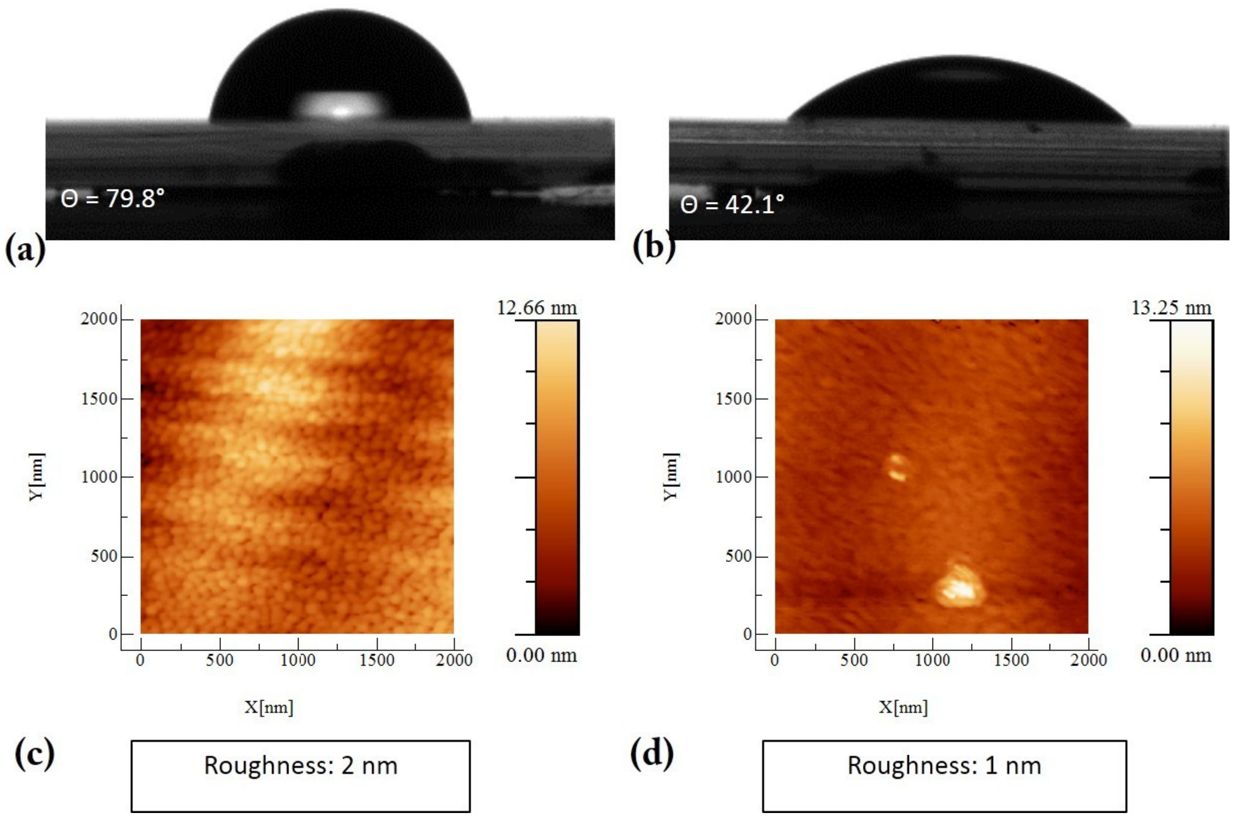


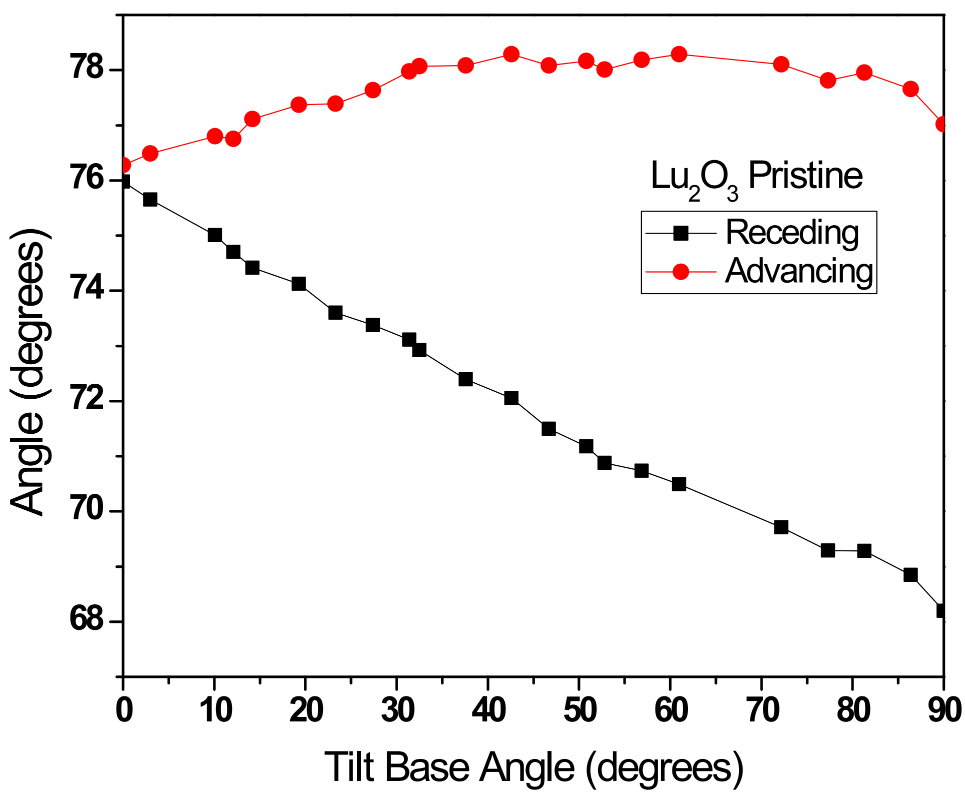
Fig. S3: Wetting properties of CeO2 thin film grown on YSZ [1 0 0]: Water Contact Angle measurement of (a) pristine and (b) annealed CeO_2 thin-film. Atomic Force Microscopy images of (c) pristine and (d) annealed surface of CeO_2 thin-film.

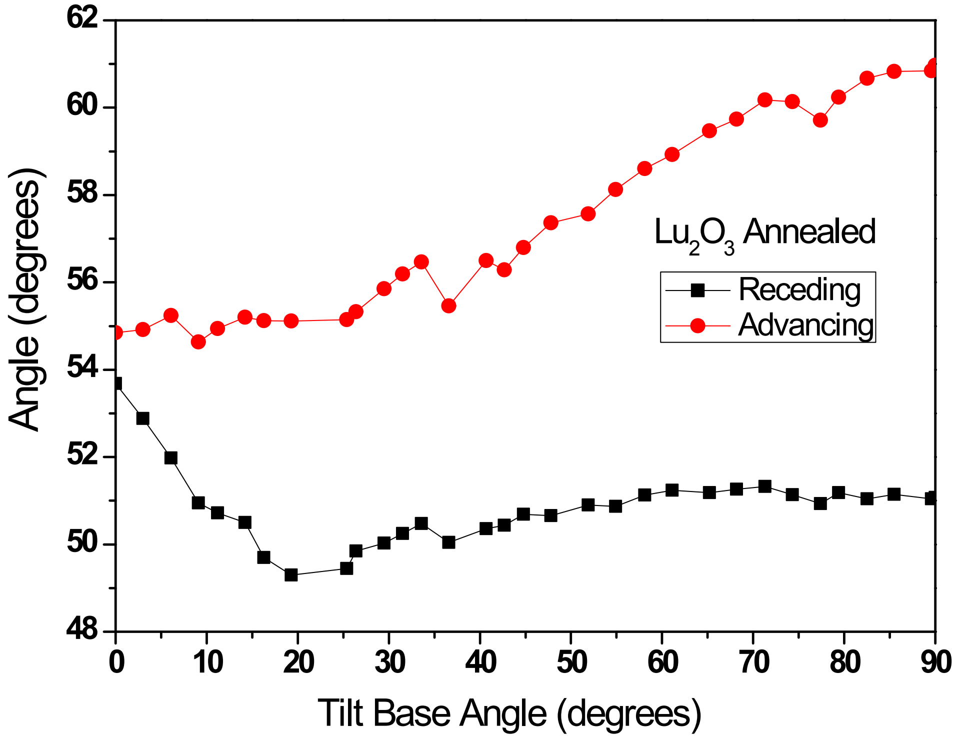
CeO_2 films were also grown on YSZ [1 0 0] by pulsed laser deposition with a stoichiometric target of CeO_2. The thin films were deposited at a temperature of 850°C and under ≈ 10mTorr Oxygen partial pressure. Before growth chamber was pumped down to base pressure of ≈ 5×10^{-7} mbar. The 248 nm wavelength KrF laser was utilized to ablate the ceramic target. The incident laser energy density and the repetition rate were 1.5 J/cm^2 and 5 Hz, respectively.

All the water contact angle and AFM measurement were done using identical procedure described in the "EXPERIMENTAL AND COMPUTATIONAL METHODS" part of the main text.

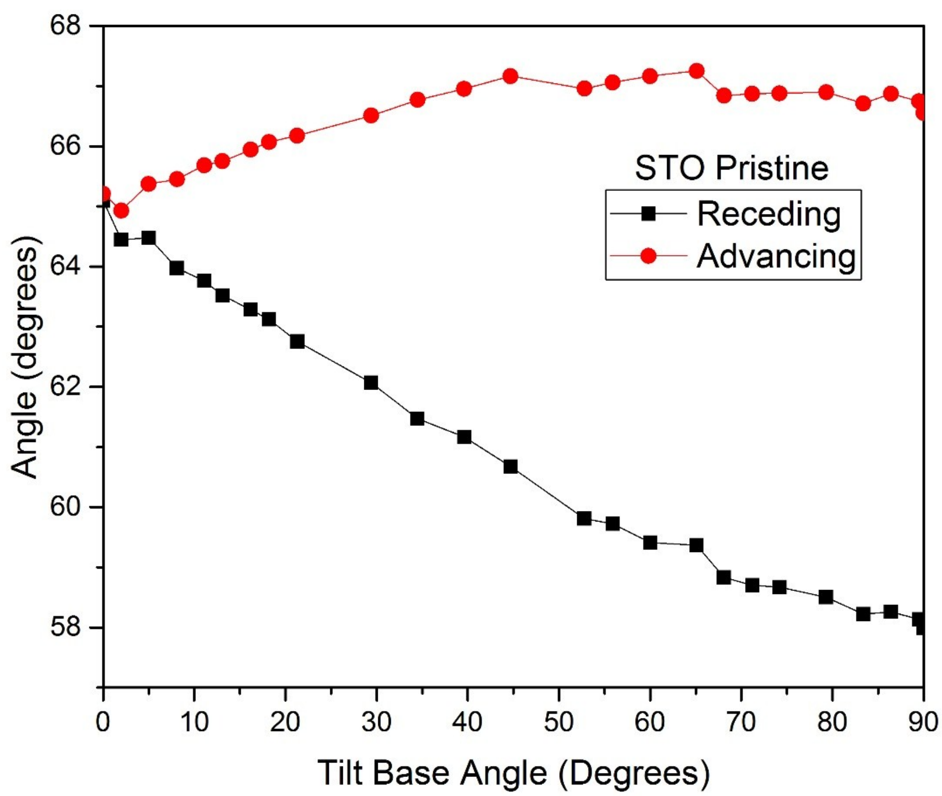
Static and dynamic contact angle measurements on SrTiO3 and Lu2O3 samples:

Sample	Static Contact Angle	Advancing Contact Angle	Receding Contact Angle
Lu_2O_3 Pristine	76.1	77.0	68.2
Lu_2O_3 Annealed	54.9	60.9	51.1
STO Pristine	65.1	66.5	57.9
STO Annealed	56.0	59.0	50.1

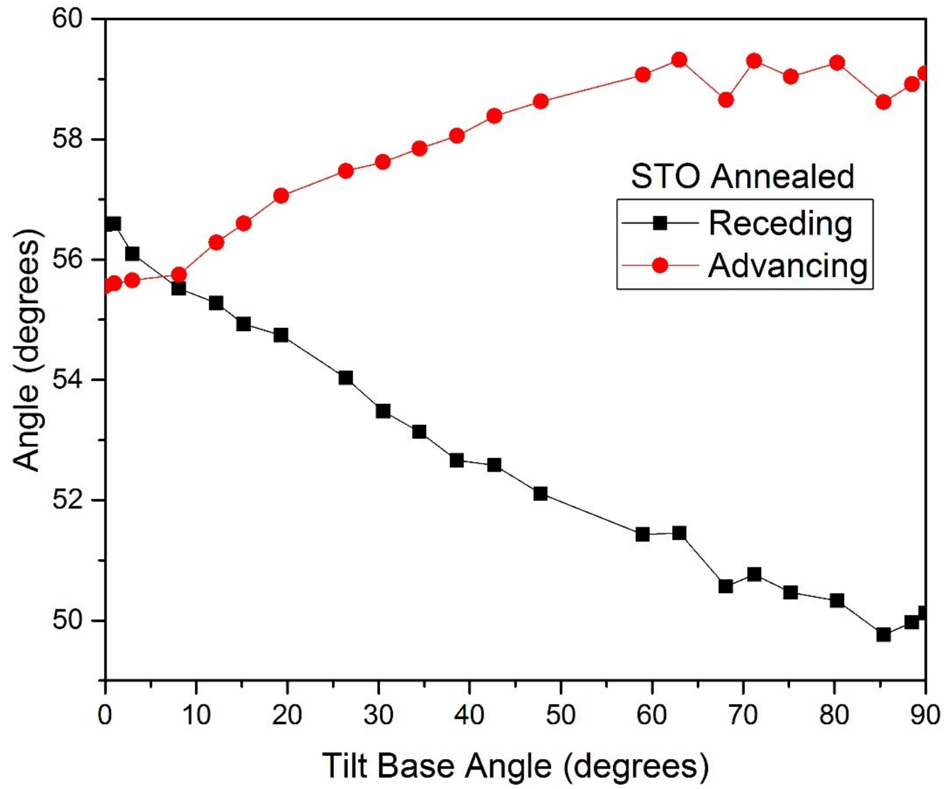




Lu2O3 Annealed
Receding
Advancing
Angle (degrees)
Tilt Base Angle (degrees)



STO Pristine
Receding
Advancing
Angle (degrees)
Tilt Base Angle (Degrees)



60
58
56
54
52
50
Angle (degrees)
0
10
20
30
40
50
60
70
80
90
Tilt Base Angle (degrees)
STO Annealed
Receding
Advancing