Supporting Information

Tuning the Band Gap and Carrier Concentration of Titania Films Grown by Spatial Atomic Layer Deposition: A Precursor Comparison

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Table S1: SALD flow rates and deposition conditions for each precursor

	$TiCl_4$	**TTIP**
Bubbling rate through metallic precursor [mL/min]	7	100
Bubbling rate through oxidant precursor [mL/min]	20	50
Flow into head (inert) [mL/min]	2000	1000
Flow into head (oxidant) [mL/min]	150	100
Flow into head (metallic) [mL/min]	100	500
Precursor temperature [°C]	Room T	70
Head temperature [°C]	40	110

Table S2: Combination of AC and DC biases used to give an overall maximum voltage of -0.1 V.

AC Bias [V]	**DC Bias [V]**	**Maximum Voltage [V]**
0.025	-0.125	-0.1
0.050	-0.150	-0.1
0.075	-0.175	-0.1
0.100	-0.200	-0.1
0.125	-0.225	-0.1
0.150	-0.250	-0.1
0.175	-0.275	-0.1
0.200	-0.300	-0.1
0.225	-0.325	-0.1
0.250	-0.350	-0.1

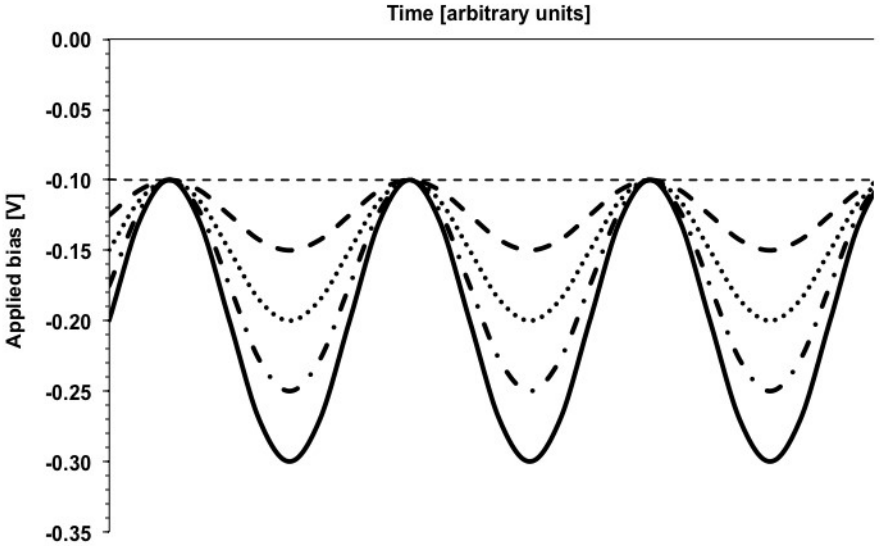
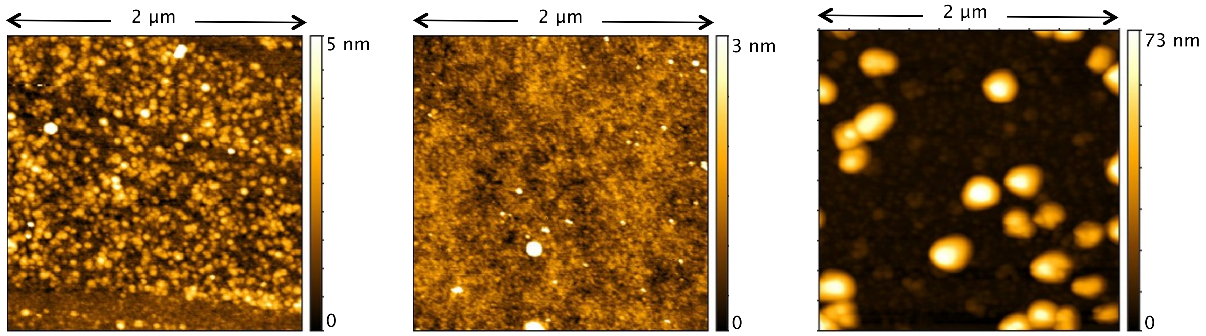


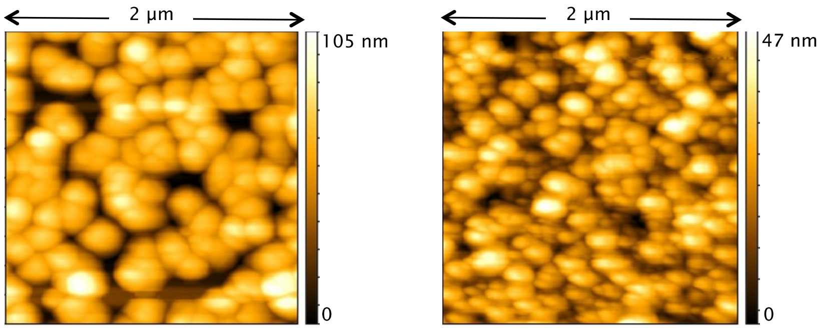
Figure S1: A schematic of how the AC and DC bias is applied to the sample such that the maximum voltage ($V=V_{AC}+V_{DC}$) remains constant (in this case, at -0.1 V).

Table S3: Sample data set showing calculation of the average growth rate for films deposited from $TiCl_4$ and H_2O at 300°C. Osc = oscillation, σ_{mean} = standard error of the mean.

Sample	Number of osc	Thickness [nm]	Growth Rate [nm/osc]
1	100	28	0.28
2	100	31	0.31
3	200	62	0.31
4	200	78	0.39
5	200	63	0.32
6	300	93	0.31
7	300	101	0.34
8	300	102	0.34
9	400	148	0.37
10	400	159	0.40
11	500	167	0.33
12	500	185	0.37
		Average	0.34
		σ_{mean}	0.011

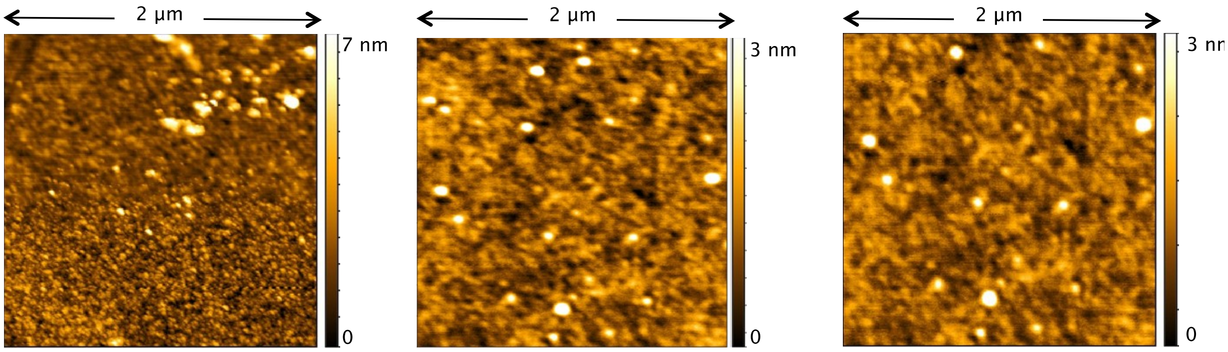


(a) 100˚C 85 nm on glass (b) 150˚C 85 nm on glass (c) 200˚C 85 nm on glass

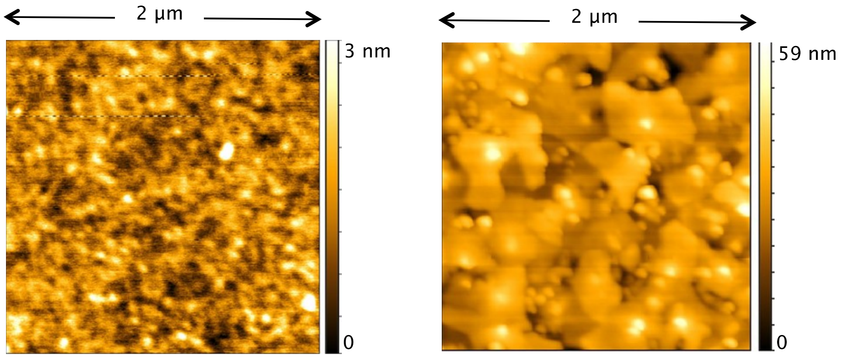


(d) 250˚C 85 nm on glass (e) 300˚C 85 nm on glass

Figure S2: AFM of TiO_2 films deposited at different temperatures on glass from $TiCl_4$. Film thicknesses presented under each AFM image.



(a) 100˚C 95 nm on glass (b) 150˚C 95 nm on glass (c) 200˚C 100 nm on glass



(d) 250˚C 100 nm on glass (e) 300˚C 90 nm on glass

Figure S3: AFM of TiO_2 films deposited at different temperatures on glass from TTIP. Film thicknesses presented under each AFM image.

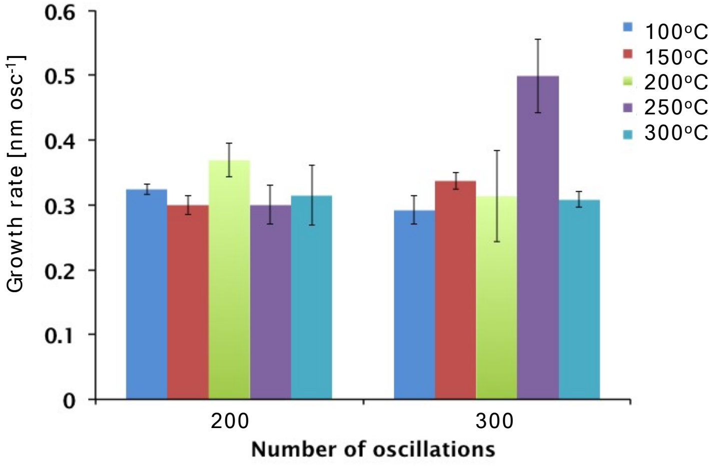


Figure S4: Growth rate vs. number of oscillations (4 ALD cycles) for each deposition temperature for films deposited from $TiCl_4$ on ITO showing an increase in growth rate from 200 to 300 oscillations due to agglomerates.

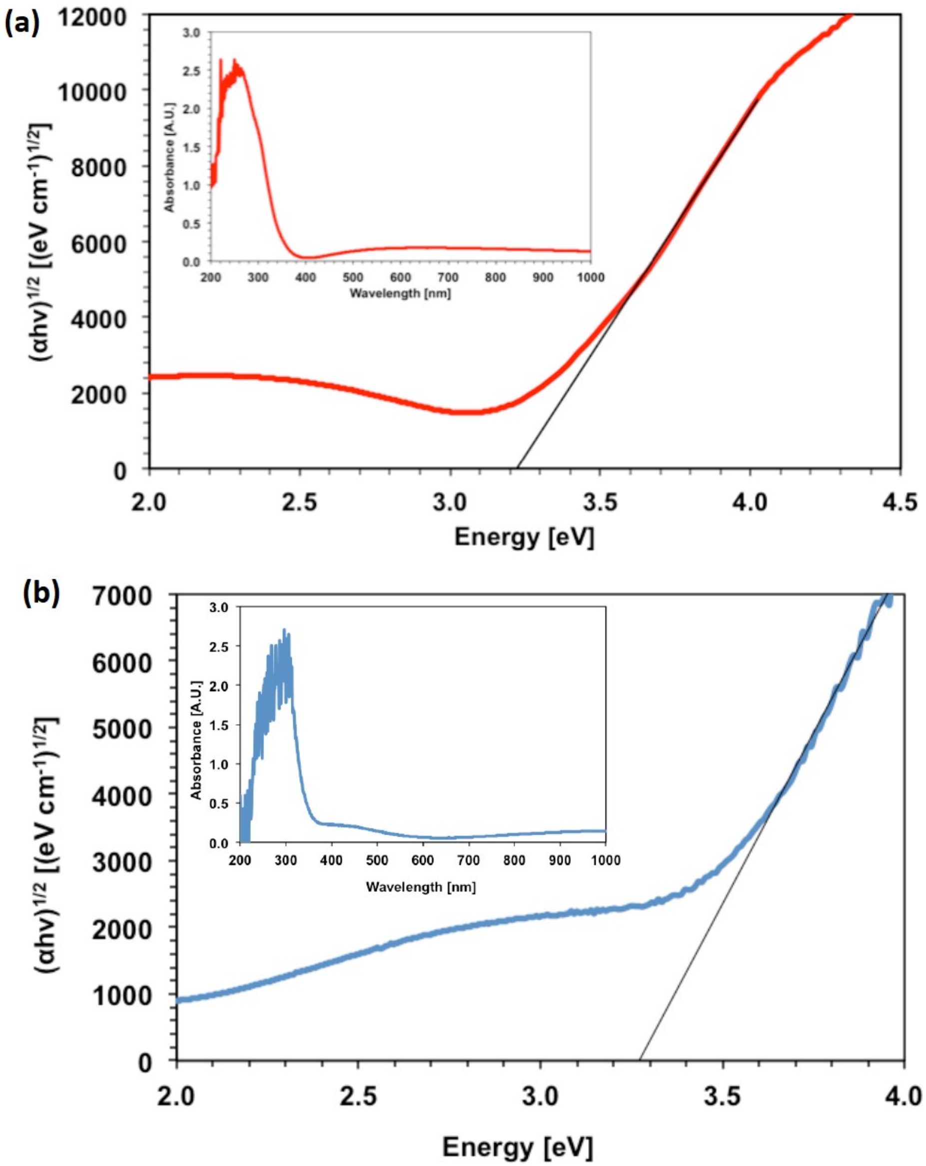


Figure S5: Example Tauc plot and corresponding absorbance spectrum (inset) for TiO_2 deposited at 300°C from water and (a) $TiCl_4$ and (b) TTIP.