Supporting Information

Comprehensive Study of Ultrathin TiN Films by ALD: Influence of Film Thickness and Substrate on Composition, Structure, Sheet resistance and Durability

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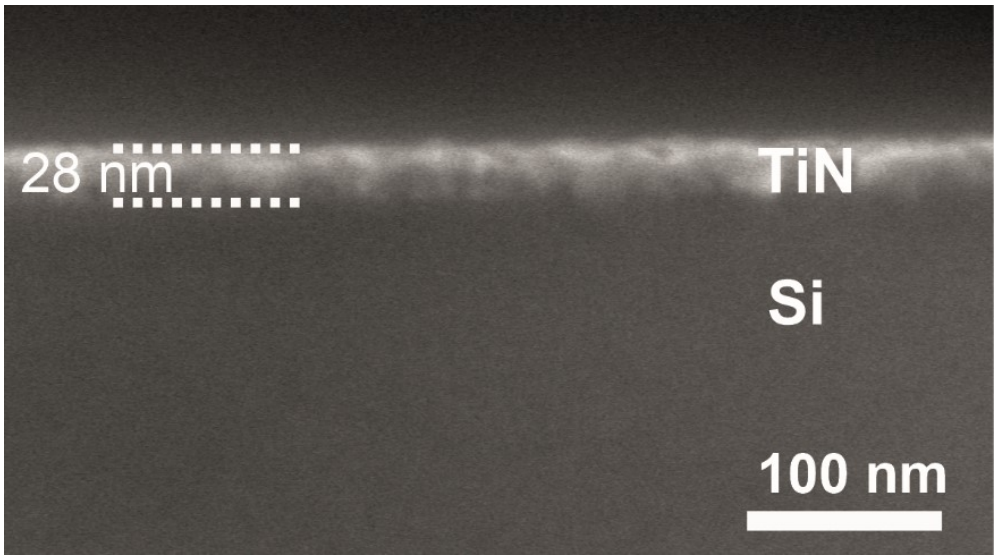

Figure S1. Cross-sectional SEM image of 600c ALD TiN layer grown on Si wafer.

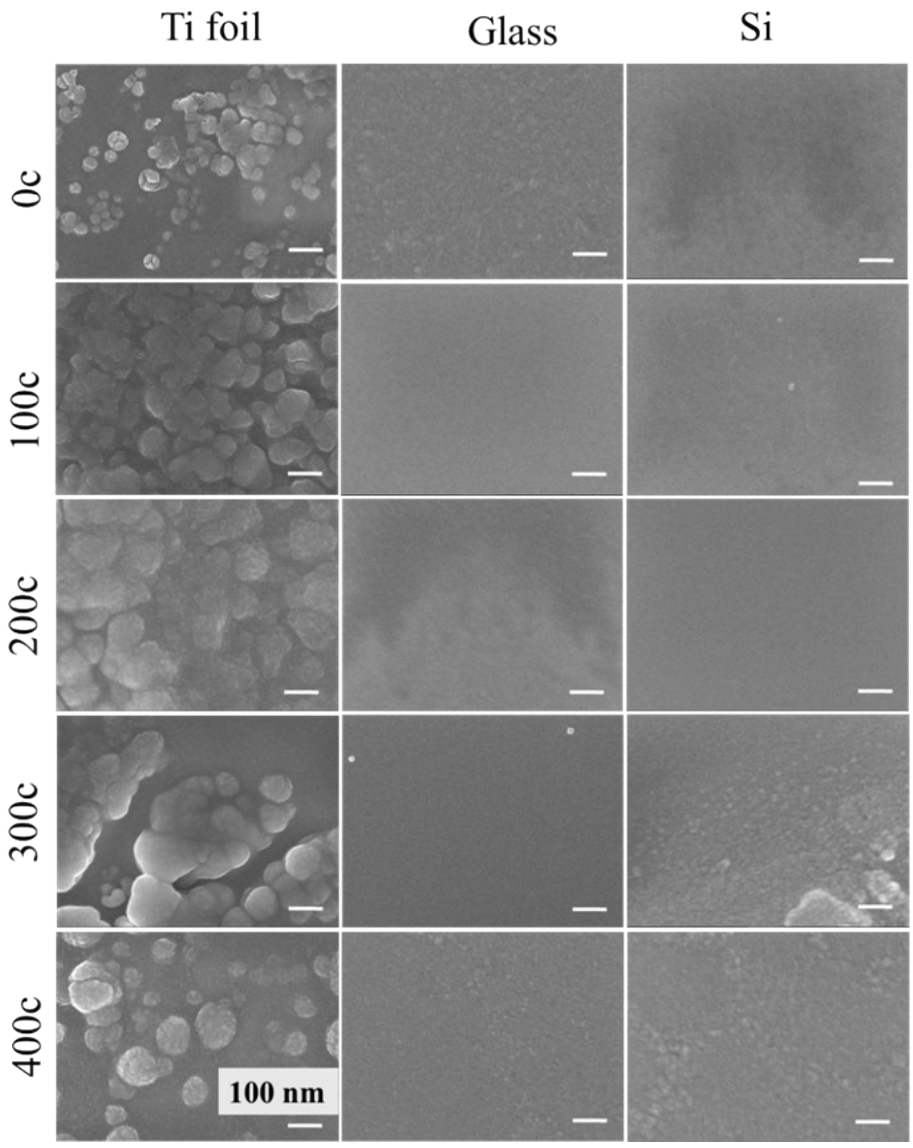

Figure S2. Low-magnification SEM top-view images of Si wafer, soda lime glasses and Ti foil in the uncoated state (0c) and coated with 100c, 200c, 300c and 400c of ALD TiN, respectively. Scale bars represent 100 nm.

Table S1. Comparison of different ALD processes used for preparing TiN thin films, in terms of precursors, growth rate and resistivity.

Technique	Precursors used / deposition temperature	Thickness of TiN film (nm)	Resistivity	Ref.
PE-ALD	TDMAT and NH_3	~ 16 nm	180 μΩ cm	29
Thermal ALD	$TiCl_4$ and NH_3 @375 to 500 °C	~20-30 nm	200 μΩ cm (for 425°C)	37
	N_2H_4, TDMAT @350 °C, TDEAT @ 400 °C, TEMATi @ 425 °C)	TDMAT = ~15 nm, TDEAT = ~15-18 nm, TEMATi = ~15 nm	TDMAT = 400 μΩ cm TDEAT = 295 μΩ cm TEMATi =220 μΩ cm	31
	$TiCl_4$ and N_2H_4 @300°C and 400°C	~13 nm @ 300 °C, ~11-13 nm @ 400 °C	359 μΩ cm @ 300 °C, 593 μΩ cm @ 400 °C	38

	TDMAT and NH_3 @300°C	~20 nm-30 nm	53×10^3 μΩ cm	29
	$TiCl_4$ and NH_3 @400°C	18.8 nm	540 μΩ cm	This work