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Surface Roughness of ALD films

Zisong Nie
zisong@seas.upenn.edu

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Keywords

Surface Roughness ALD

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Surface Roughness of ALD films (Graduate Student Fellow Program)

Prepared by Zisong Nie (3/3/2015)

- See the default recipes on the following web pages:
https://www.seas.upenn.edu/~nanosop/ALD_Recipes.htm
- SiO₂: Precursor, Tris(dimethylamino)silane and O₃, 250 °C
- Al₂O₃: Precursor, Trimethylaluminum and H₂O, 150 °C
- HfO₂: Precursor, Tetrakis(dimethylamino)hafnium and H₂O, 200 °C
- TiO₂: Precursor, Tetrakis(dimethylamido)titanium and H₂O, 200 °C
- AFM: Bruker Icon AFM at NBIC Scanning Probe Lab
- Image treatment: 100 nm x 100nm, 2nd order plane fit, 1st order flatten and low pass filter

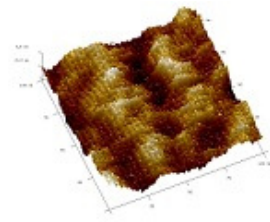
Surface roughness (nm)

		cycles			
		0	10	50	100
Al ₂ O ₃	PV	0.0544	0.43	0.545	0.675
	rms	0.077	0.0587	0.0649	0.0718
	Ra	0.0625	0.0465	0.0505	0.0567
SiO ₂	PV	0.0544	0.822	0.474	0.716
	rms	0.077	0.0937	0.0662	0.0901
	Ra	0.0625	0.0726	0.0529	0.0686
HfO ₂	PV	0.0544	---	0.36	0.432
	rms	0.077	---	0.0586	0.0603
	Ra	0.0625	---	0.0477	0.0461
TiO ₂	PV	0.0544	0.294	0.325	0.333
	rms	0.077	0.0333	0.0355	0.0381
	Ra	0.0625	0.0265	0.0284	0.0304

PV: Peak to Valley

rms: Root mean square

Ra: Average of roughness



Blank wafer
(100 nm x 100 nm)

