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Nickel and Tantalum Sputtering Film using AJA#1 Sputter

Experimental: Nickel and Tantalum films were sputtered onto Si pieces, then, these pieces were cleaved for SEM to get the film thickness as well as cross-section profile). Prior to Ni and Ta film sputtering, the top native oxide of these Si pieces was sputtered off using Ar plasma with the bias voltage ~150V for 5 minutes.

Results:

A) Ni Sputtering

Table 1

Ni Sputtering Film using AJA#1 Sputtering tool at RT									
Sample#	Pressure (mT)	DC Power (W)	Ar Flow-rate (sccm)	Time (s)	Height (mm)	Gun Angle	Rotation (%)	Ni Film Thickness (Å)	Sputtering Rate (Å/s)
1	5	150	25	1800	44	4	50(~10rpm)	1570	0.872
2	5	75	25	1800	44	4	50(~10rpm)	751	0.417
3	5	150	25	1800	25	9	50(~10rpm)	546	0.303

B) Ta Sputtering

Table 2

Ta Sputtering Film using AJA#1 Sputtering tool at RT									
Sample#	Pressure (mT)	DC Power (W)	Ar Flow-rate (sccm)	Time (s)	Height (mm)	Gun Angle	Rotation (%)	Ni Film Thickness (Å)	Sputtering Rate (Å/s)
1	5	150	25	1800	44	4	50(~10rpm)	2840	1.578
2	5	75	25	1800	44	4	50(~10rpm)	1510	0.839

C) Sputtering off native oxide

Table 3

Sputtering Native Oxide off Si surface using AJA#1 Sputtering tool at RT							
Sample#	Pressure (mT)	DC Bias Power (W)	Ar Flow-rate (sccm)	Time (s)	Height (mm)	Gun Angle	Rotation (%)
1	10	18(~150V)	25	300	44	4	50(~10rpm)

Figure 1 Ni and Ta film profile (Bottom Film: Ni; Top Film: Ta) using AJA#1 sputter with pressure=5mT, Ar flow-rate=25sccm, height=44 mm, gun angle=4, rotation~10rpm, and sputtering time is 30 minutes for both Ni and Ta films. (a) DC power=150W; (b) DC power=75W.

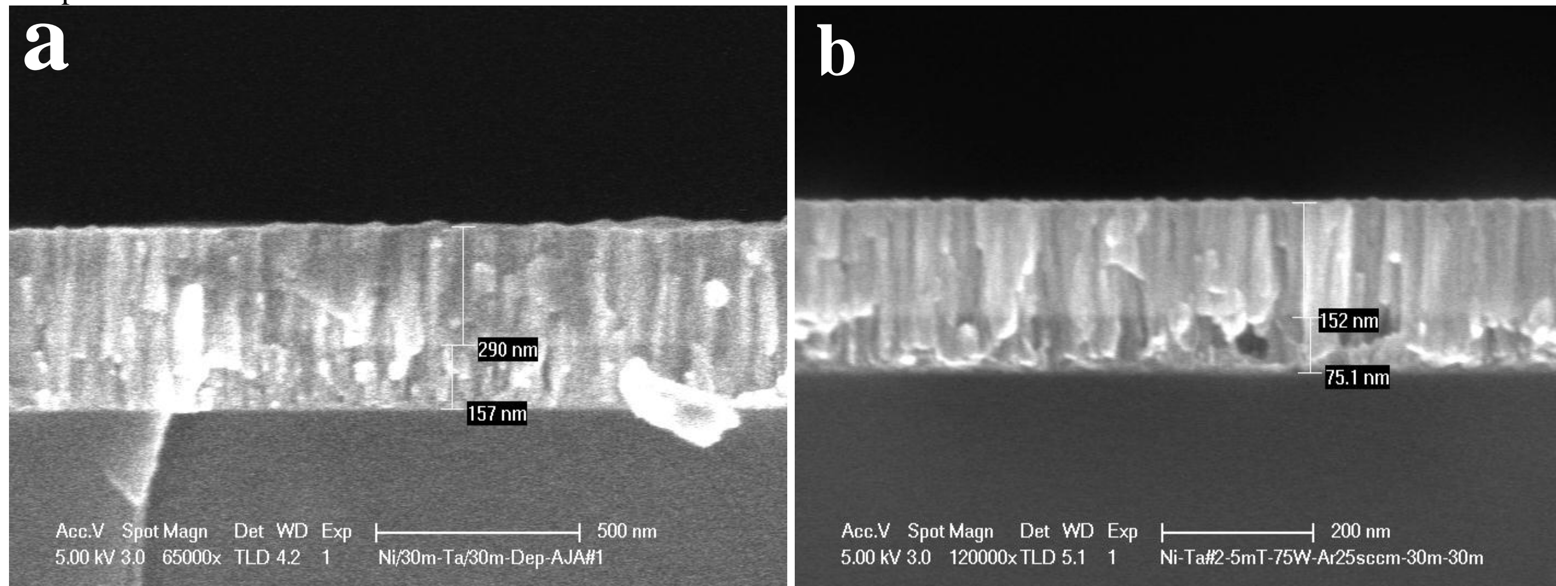

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Figure 2 Ni film profile using AJA#1 sputter with pressure=5mT, DC power=150 W, Ar flow-rate=25sccm, height=25 mm, gun angle=9, rotation~10rpm, and sputtering time is 30 minutes.