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Al-Sputtering-Film on 4" Si wafer
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Process Sequence:
1) Clean 4" Si wafer: solvent clean [acetone (2') + methanol (1') in ultrasonic clean bath and DI rinse] and BOE dip (1'), DI rinse, and N_2 blow dry.

2) Sputter Al film using Sputter#2 with PM1 (make sure the Al target is inside of PM1).

Sputtering Recipe: Ning_al_1 (power=500 W, Ar flow=20 sccm, time=7200 sec for ~3 μm thick Al film).

Ning_clean_2 (power=3000 W, Ar flow=20 sccm, time=600 sec).

heat_350_1800 (PM1 chamber is heated to 350 ^{0}C and remained at the temperature for 999 sec).

Ning_clean_3 (power=3000 W, Ar flow=20 sccm, time=300 sec).

Ning_condi_2 (power=500 W, Ar flow=20 sccm, time=600 sec).

Sputtering Flow:

ning_Al_1:	1	PM1	Wait	30 seconds
	2	PM1	Sputter	Ning_al_1
	3	PM1	Wait	30 seconds
ning_cl_co_2:	1	PM1	Wait	30 seconds
	2	PM1	Sputter	Ning_clean_2
	3	PM1	Wait	30 seconds
	4	PM1	Heat	heat_350_1800
	5	PM1	Wait	30 seconds
	6	PM1	Sputter	Ning_clean_3
	7	PM1	Wait	30 seconds
	8	PM1	Sputter	Ning_condi_2

9	PM1	Wait	30 seconds

Sputtering Sequence: ning_al_1 (#5 A ning_cl_co_2; #10 A ning_Al_1).

3) Vent CM (cassette module) and, after reaching to atmosphere, load the wafer with the sputtering-film-side down into slot#10, counted from the bottom of the cassette, and a dummy Si wafer into slot#5.

4) Pump down CM.

5) Run automatically Sputtering Sequence of ning_al_1.

6)Wait until the sequence is finished, then vent CM and take both the Al-sputtered and dummy wafers out, then flip the Al-sputtered wafer and insert the wafer into slot#5 with the un-sputtered-side-down to do the back-side Al film sputtering.

Sputtering Recipe: Ning_al_2 (power=500 W, Ar flow=20 sccm, time=710 s for ~0.3 μm thick Al film).

Sputtering Flow:	ning_al_2:	1	PM1	Wait	30 seconds
		2	PM1	Sputter	Ning_al_2
		3	PM1	Wait	30 seconds

Sputtering Sequence: ning_al_2 (#10 A ning_al_2).

7) Pump CM down.

8) Run automatically Sputtering Sequence of ning_al_2.

9) Wait until the sequence is finished, then, vent CM and take the Al-sputtered wafer out.

10) Pump CM down.

Figure 1 a) Microscopic picture (with a 50X objective lens) of Al film using Sputter#2 tool; b) Microscopic picture (with a 100X objective lens) of Al film using Sputter#2 tool.

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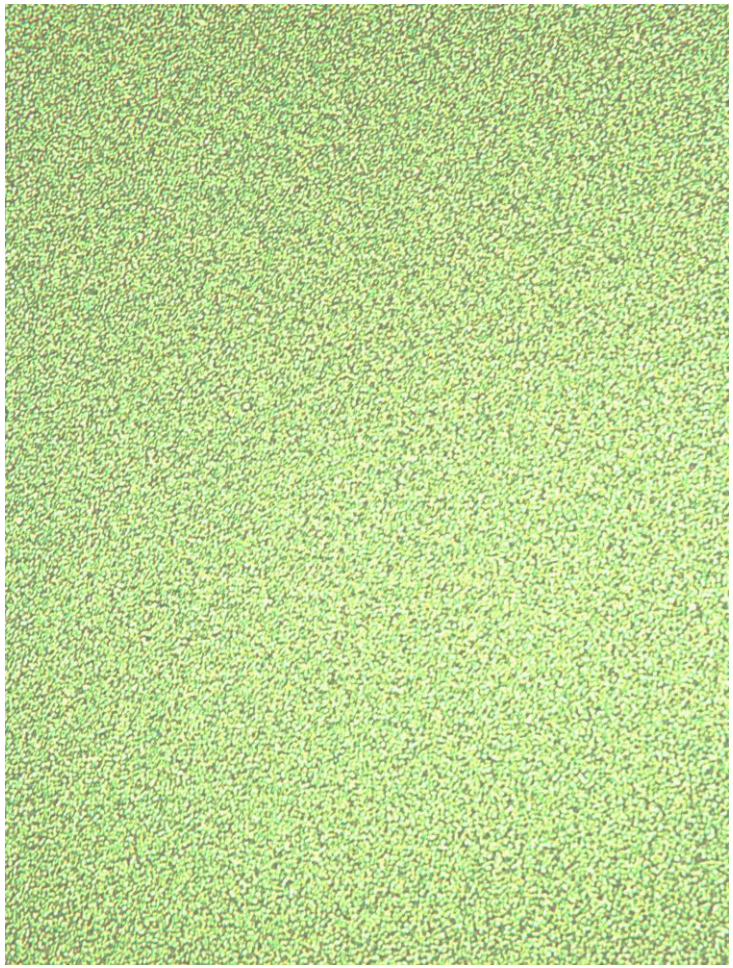
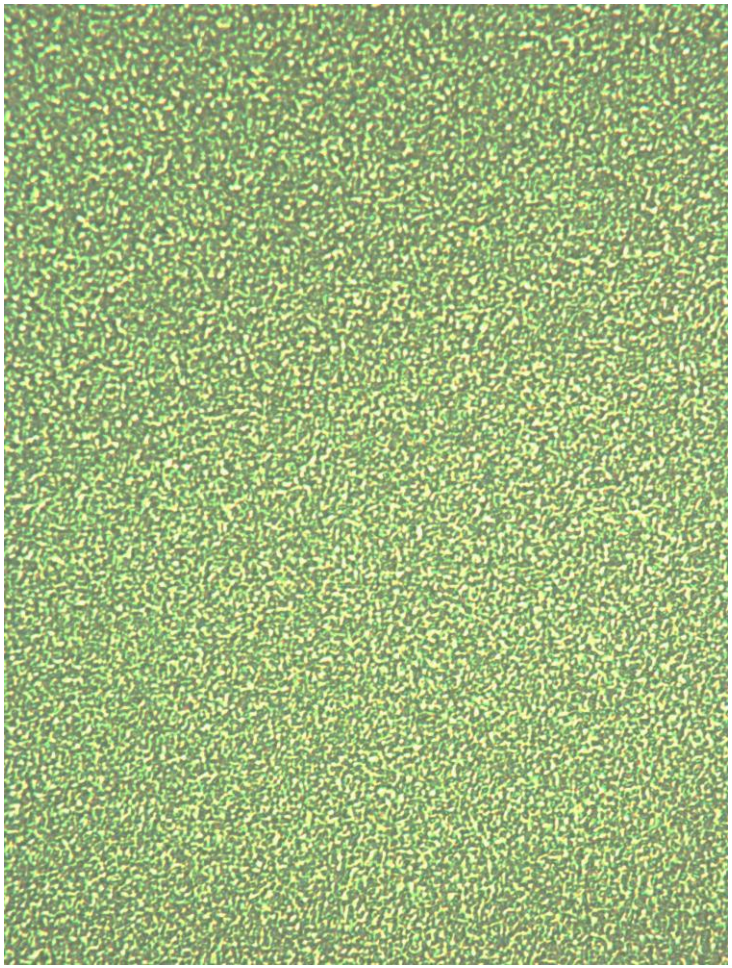


(a)



(b)