Film Properties of Low-Stress SiN_x deposited at the chuck temperatures of 50, 100 and 250ºC using Unaxis ICP PM3 deposition tool with pressure=15 mT, bias/ICP powers=120/400 W, and SiH_4(100%)/He/N_2: (a) 9.0/400/4 sccm (at 50ºC); (b) 9.0/400/4 sccm (at 100ºC); (c) 8.6/400/4 sccm (at 250ºC).

Low-Stress SiN_x Film (120W Bias Power, No Ar), Grown using Unaxis ICP PM3 Deposition Tool, Characterizations				
	50ºC(ICP)	100ºC(ICP)	250ºC(ICP)	250ºC(PECVD)
Refractive Index	~2	~2	~2	~2
Deposition Rate (nm/min.)	28.9	28	26.7	10
Buffered HF Etch Rate (nm/min.)	24	22.5	9.9	36
Film Stress (~200 nm in Thickness) (MPa)	-87	-97	-133	260

Note: a positive sign means a tensile stress, whereas a negative sign means a compressive stress.

Pin-hole Testing Result

Low-Stress SiN_x Film, deposited at 250 C with 15mT, 120/400W, SiH4/N2/He flow-rate=8.6/4/400sccm, and deposition time=600s.

Film thickness and refractive index are 2483Å and 2.03, respectively.

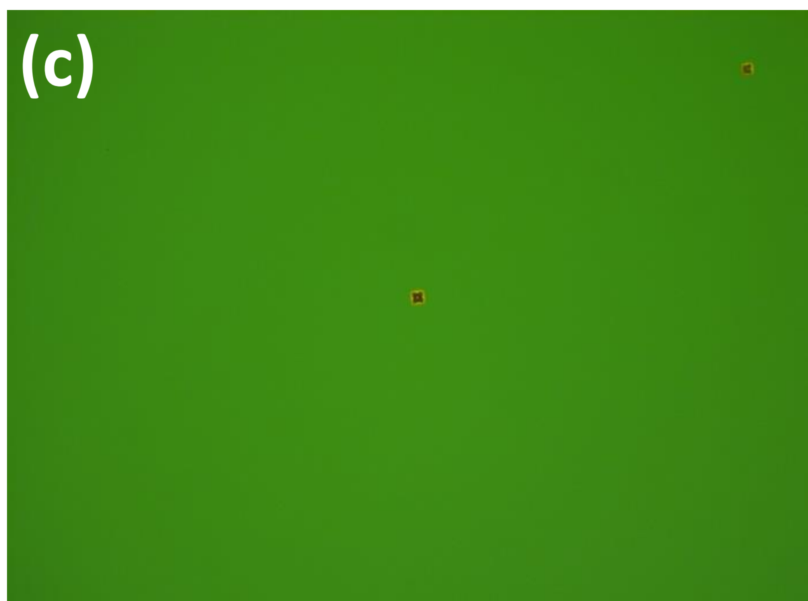
Film stress is ~-133MPa).

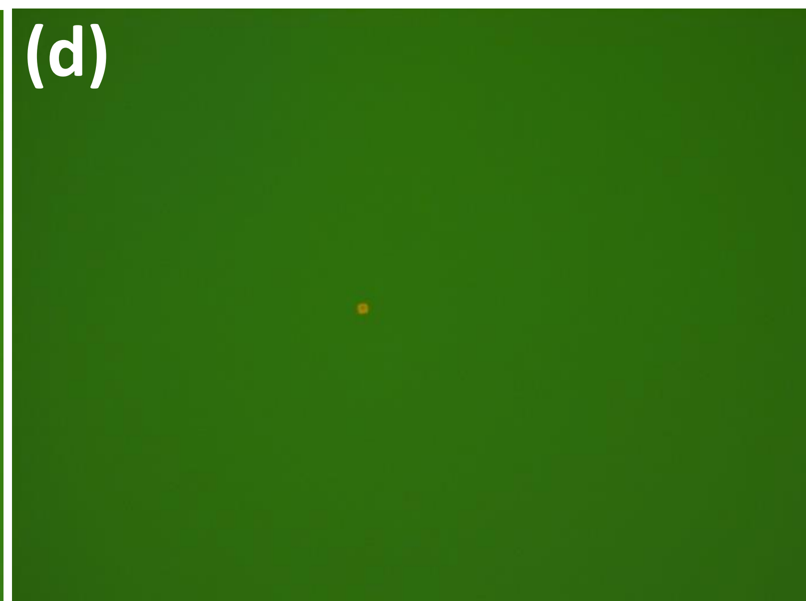
Pin-Hole Result (In KOH@90C, 20minutes): good (see Figure 1 below).

Figure 1 (a), (b), (c), and (d) Microscopic pictures show the low-stress SiN_x film, deposited at 250 C with 15mT, 120/400W, SiH_4/N_2/He flow-rate=8.6/4/400sccm, and time=600s, after socking in KOH at 90 C for 20 minutes.

(a)

(b)


(c)


(d)