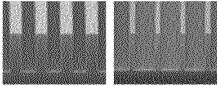
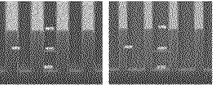
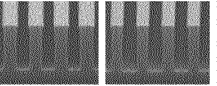
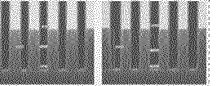


Table 2. Shelf life of different PAG/quencher combination

Different quencher / PAG combination to improve aging								
Substrate : 8inch on Si wafer; SB : 110degC/120sec; F.T. : 6.0um Exposure : ORC 8300, i line stepper, NA=0.16; PED: 2hr Development: 2.38% TMAH 23degC 60sec x 3puddles								
	NIN / TOA(0.6)		NIN / DIPA(0.3)		NIN / TBA (0.5)		PAG103 / TOA(0.5)	
	-20°C	40°C/2w	-20°C	40°C/2w	-20°C	40°C/2w	-20°C	40°C/1w
FT@1350rpm	5.96µm	6.02µm	6.42µm	6.63µm	6.94µm	7.19µm	6.41µm	6.49µm
Eth (mJ/cm²)	80mJ	50mJ	100mJ	70mJ	30mJ	20mJ	95mJ	>90mJ
Pattern Profile	2.0µmL&S		2.0µmL&S		2.0µmL&S		1.5µmL&S	
								
	2.0µm L&S		2.0µm L&S		Bad pattern profile		1.5µm L&S	
Space CD	2.05µm	3.06µm	1.88µm	2.54µm	Bad pattern profile		1.19µm	1.21µm

SEM cross-sections results (~100 mJ/cm²) for photoresist formulations with different PAG and quenchers to improve aging: Ex. 4 (NIN/TOA (0.6 wt. ratio); Ex. 3 (NIN/DIPA(0.5 wt. ratio)); Ex. 8 (NIN/TBA (0.5 wt. ratio)); Ex. 6 (PAG 103/TOA (0.5 wt. ratio)).

FIG. 1

Table 3 Effect of Salicylic acid on shelf life at Low and High Temperatures

Aging test with Salicylic acid loading

Substrate : 8inch on Si wafer; SB : 110degC/120sec; F.T. : 6.0um
Exposure : ORC 8300, I line stepper, NA=0.16; PED: 2hr
Development: 2.38% TMAH 23degC 60sec x 3puddles

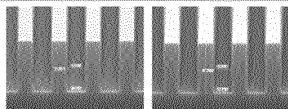
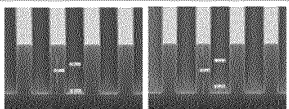
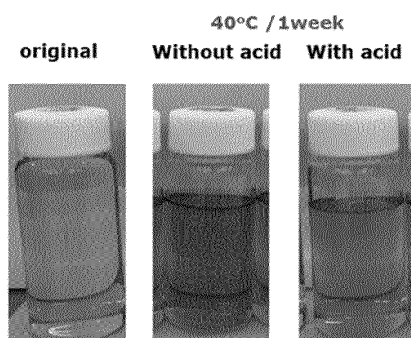
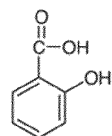
0.1% Salicylic acid 190mJ						
	-20°C	40°C/1w	-20°C	40°C/2w	-20°C	40°C/3w
FT@1400rpm	6.02µm	6.15µm	6.031µm	6.15µm	6.04µm	6.21µm
Eth (mJ/cm²)	90mJ	85mJ			85mJ	80mJ
Pattern Profile						
2.0µm L&S						
Space CD	2.08µm	2.09µm	2.09µm	2.12µm	1.97µm	2.08µm
ΔCD	0.01µm (0.3%)		0.03µm(1.0%)		0.11µm(5.5%)	

FIG. 2

Discolor issue during aging**2-Hydroxybenzoic Acid****FIG. 3**

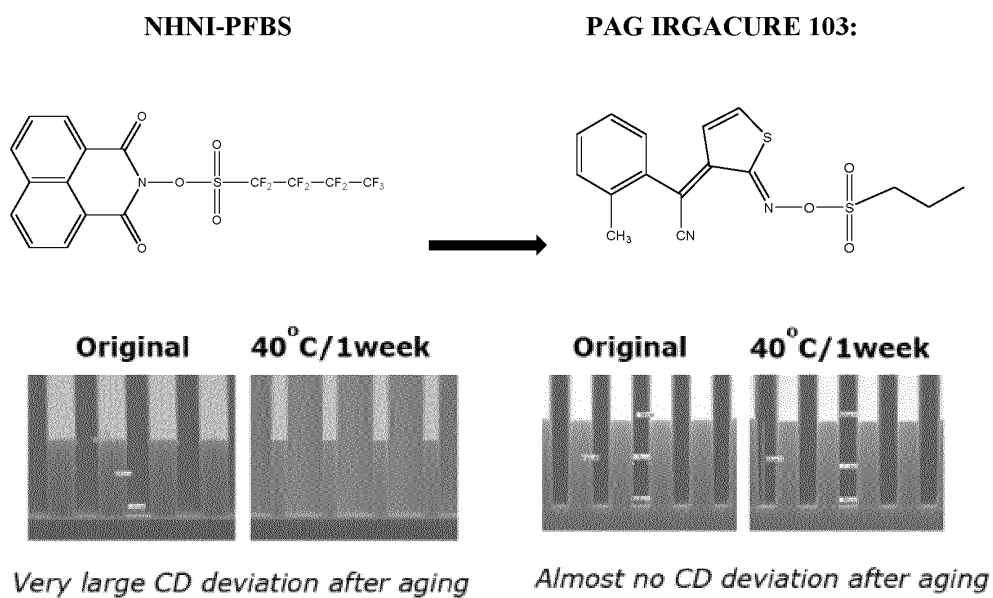


FIG. 4

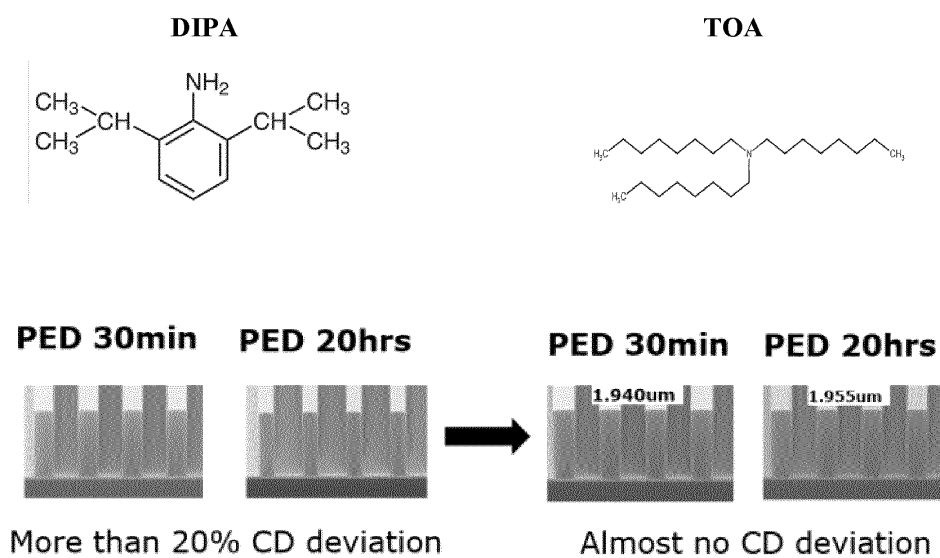


FIG. 5