

# EUV OUTGASSING AND CONTAMINATION IN MULTILAYER MATERIAL SCHEMES

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Most attention in outgas qualification is spent in the resist outgassing and contamination (ASML WS test)

How important are other layers ?



This investigation confirms that resist is the main contributor to outgassing and contamination.

However the resist related outgassing and contamination can be slightly changed by the presence of an underlying layer.

In general, top layers are good high-amu filters for outgassing of underlying layers.

Low outgas top-coats can be very effective in reducing the resist related contamination.

How effective is an UL for suppression of outgassing & contamination of underlying SoL ?

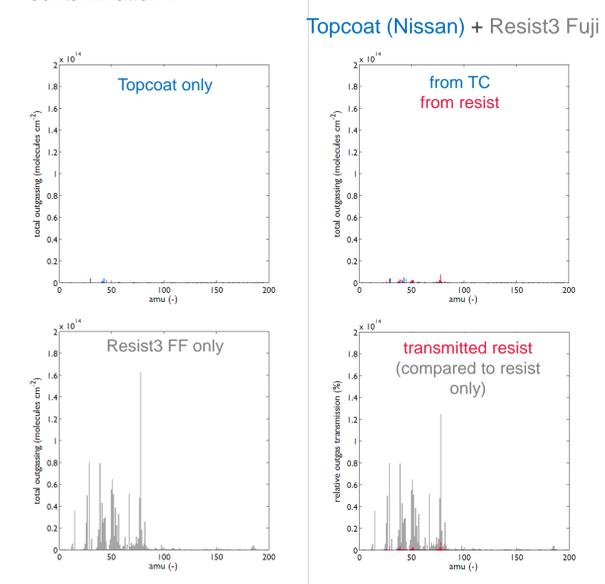
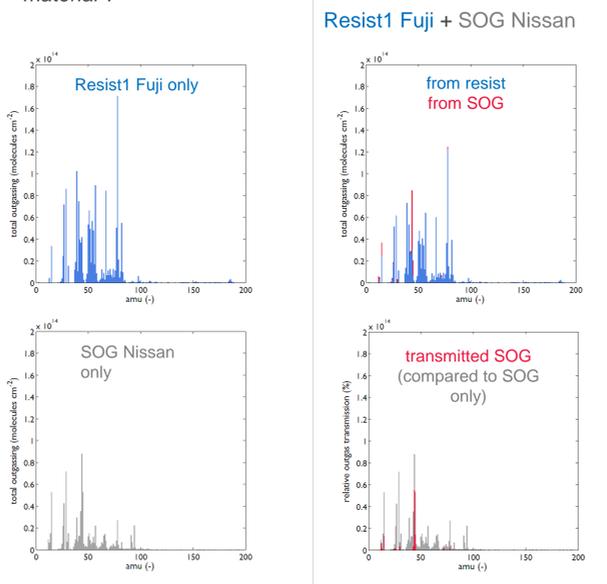
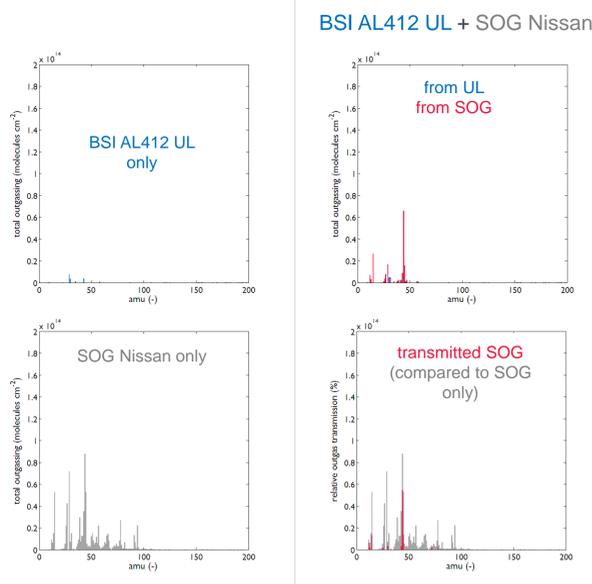


How much outgassing contamination can be expected from SoL when it is covered with resist ?



Is resist outgassing changed by underlying material ?

How effective is a topcoat for suppression of outgassing & contamination of underlying resist ? Is a topcoat resulting in contamination ?



BSI AL412 UL only

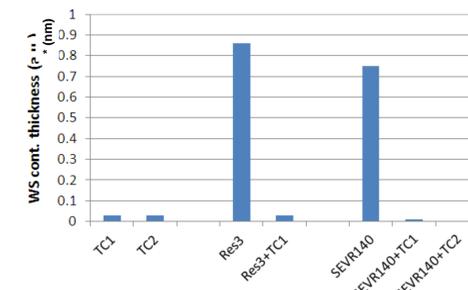
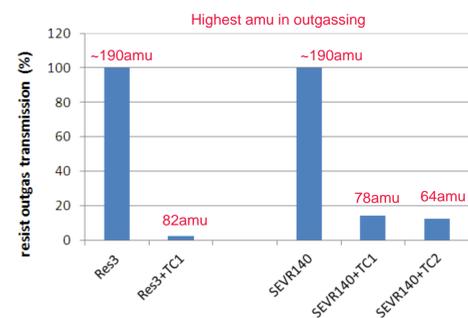
WS contamination thickness\* (nm) : 0.00

An UL, even very thin can be very efficient in reducing the SoL outgassing (if this would be required...)

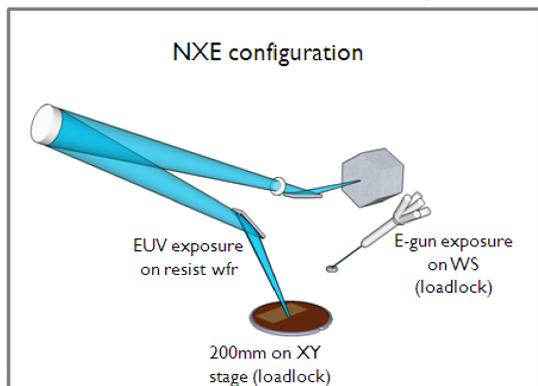
SOG Nissan only

WS contamination thickness\* (nm) : 0.05

Resist	T <sub>g</sub> (°C)	MW	Block Ratio	Resist outgassing change	SoL transmission	WS cont. thickness resist* (nm)	WS cont. thickness stack*
FF Resist1	high	high	low	-28%	13%	0.40	-
FF Resist2	low	low	high	-18%	33%	1.38	-
FF Resist3	medium	low	low	-29%	27%	0.83	0.84
SEVR140	resist chemistry		RCA outgassing		WS	0.85	



\* Using initial e-gun method (1 wafer at dose >E<sub>0</sub>)



Resist outgassing can be changed by underlying SoL stack, but the changes are small. Resist is suppressing the SoL outgassing, and resist T<sub>g</sub> seems to be related. So far the outgassing and contamination of SoL is found to be very small.

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A topcoat is a very effective way to reduce resist outgassing and contamination.

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