



## AN 428

## Detection Limits for Surface Metals on Patterned Wafers Using SurfaceSIMS

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**Discussion**

Measurement of surface metal contamination in processed wafers is an essential part of yield improvement during IC processing and an effective way to monitor and reduce overall cross contamination during processing. Monitoring the cleanliness of patterned processed wafers at selected areas is often important because it can provide specific patterning process contamination information. Unlike VPD-ICPMS or TXRF, which are suitable only for unpatterned wafer measurements, SurfaceSIMS, an ASTM test method (F 1617), is an ideal technique for small area metal contamination measurements, and it provides a broad range of elemental information unlike SPV and other optical or electrical techniques. SurfaceSIMS not only can measure areas as small as 50 $\mu$ m $\times$ 50 $\mu$ m size with great sensitivities, but also can detect buried, near-surface contaminants.

Typical SurfaceSIMS Detection Limits (10 <sup>10</sup> atoms/cm <sup>2</sup> )					
Element	Pattern Size (>100 $\mu$ m)	Pattern Size (50-100 $\mu$ m)	Element	Pattern Size (>100 $\mu$ m)	Pattern Size (50-100 $\mu$ m)
Li	0.001	0.005	V	0.01	0.04
B	0.1	0.1	Cr	0.03	0.03
C	100	100	Mn	0.05	0.05
N	300	300	Fe	0.05	0.3
F	40	40	Ni	0.5	0.5
Na	0.01	0.01	Cu	0.3	0.3
Mg	0.05	0.05	Zn	0.5	1
Al	0.05	0.05	As	0.5	0.5
P	1	1	Mo	0.1	0.3
S	2	2	Rh	0.7	0.7
Cl	20	20	Sb	0.1	0.3
K	0.01	0.01	Sn	0.1	0.3
Ca	0.05	0.05	Ta	0.1	0.3
Ti	0.05	0.05	W	0.2	0.4

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