AN 356
Metallic Contamination Determination in Thick Oxide Layers or Glass by SIMS

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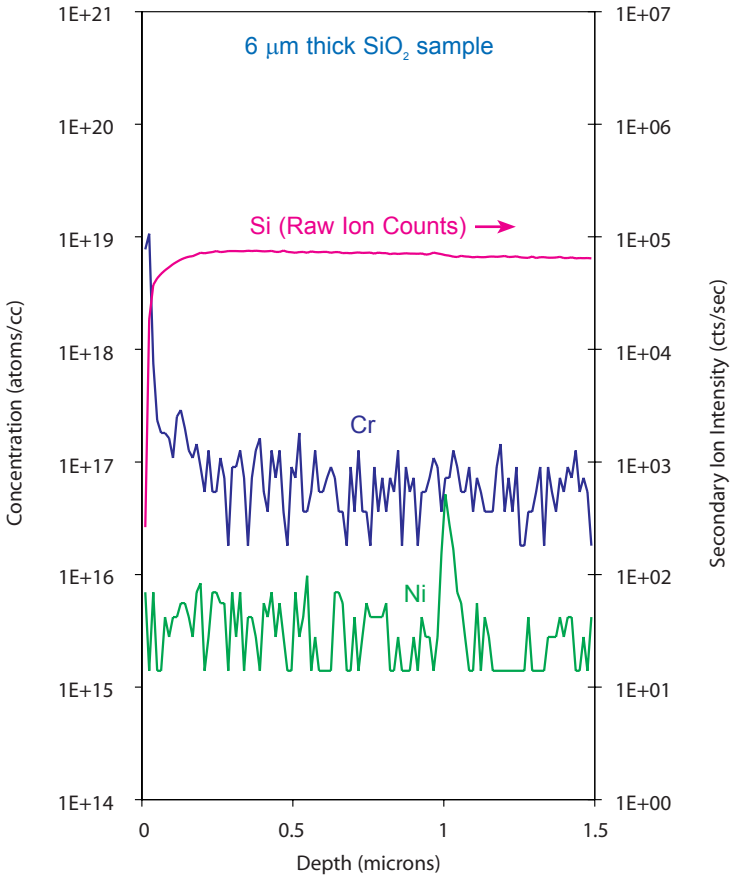
Discussion

Metallic contamination in oxide layers or glass substrates alter their insulating characteristics. At a high enough level of contamination the insulation breaks down. For clean SiO_2 the measurement is relatively straightforward. However, there may be many interferences in SiO_2 and complex glasses. It is very difficult to obtain good detection levels for metals in these >3 µm thick SiO_2 or glass substrates.

Si and oxide material vendors, semiconductor manufacturers, solar and flat panel material vendors and makers would benefit from the solution to this problem. This can also be useful for fiber optic producers where thick (10-60 µm) SiO_2 is used. High mass resolving power is essential to achieve low detection levels where interferences are present. Charge compensation is also crucial to attain the analytical goals. The combination of these will allow better determination of whether metallic contamination is present at low levels.

The figure shows Cr and Ni concentration depth profiles. Real Cr contamination is present in the upper 200 nm and throughout the measured depth at about three times the detection level. Real Ni contamination is observed at about 1 micron depth. Our detection levels in SiO_2 are Al (5e15), Cr (2e16), Fe (2e16), Ni (2e15), and Cu (2e15).



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