



AN 332 Evaluating Bond Pad Performance

May 4, 2007 (Version 3.0)

Discussion

Oxide thickness on aluminum bond pads is of critical importance in evaluating pad performance. Typical oxide layers on well functioning bond pads range from 25 to 50 Å. Thicker layers result in weak wire bonding and low or no electrical conductivity. Measuring oxide thickness provides a way to understand bond pad failure and to predict pad performance. The detection of other elements (e.g. fluorine) can provide insight into other problems, such as bond pad corrosion.

Figure 1 shows a FE-AES (Field Emission-Auger Electron Spectroscopy) depth profile into a well functioning bond pad. The oxide thickness was estimated to be ~45 Å. A similar profile for a failed bond pad, shown in Figure 2, gives an oxide thickness of ~120 Å.

Figure 3 shows a surface survey spectrum of a failed bond pad with carbon, oxygen, fluorine and aluminum present. The high levels of fluorine are observed through the oxide layer of the bond pad, suggesting that corrosion observed on the pad is catalyzed by fluoride ions.

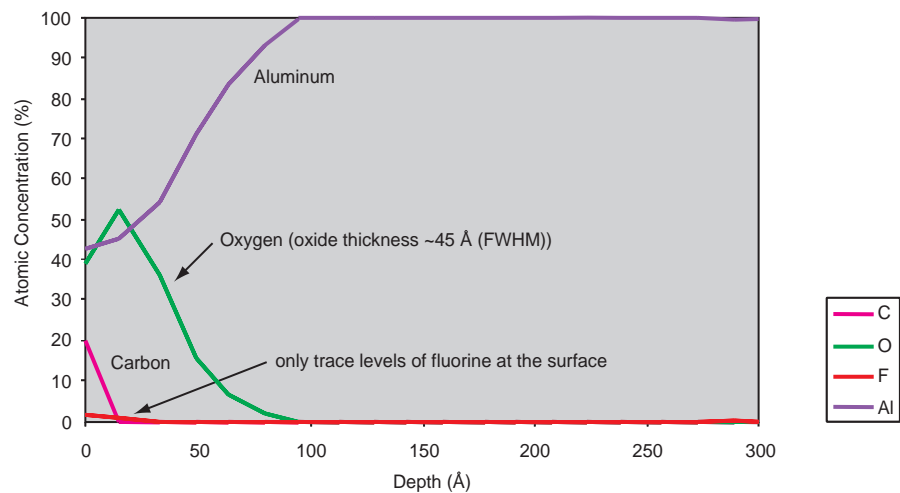


Figure 1. Depth Profile into a Well Functioning Bond Pad

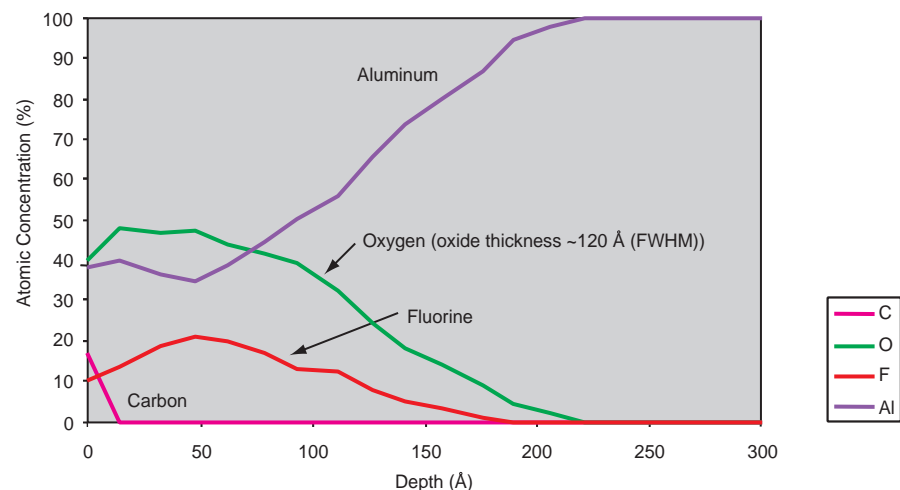


Figure 2. Depth Profile into a Failed Bond Pad

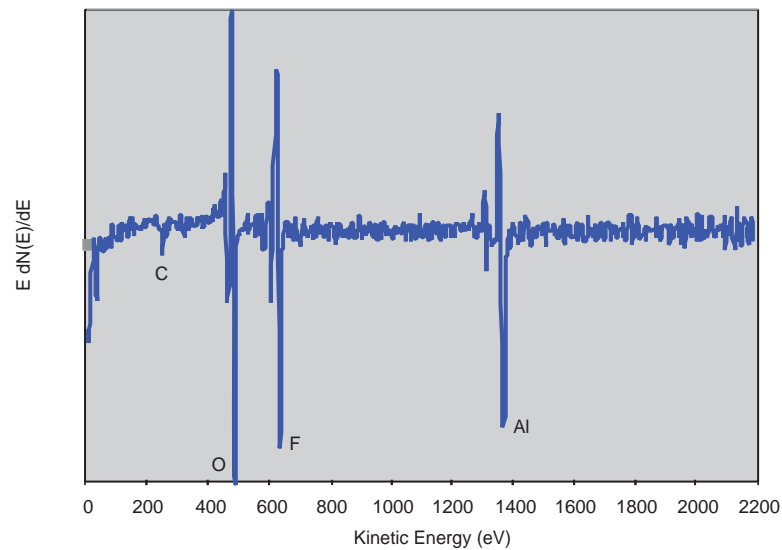


Figure 3. Surface Survey Spectrum of a Failed Bond Pad

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