Solid State Science and Technology, Vol. 16, No 2 (2008) 223-231
ISSN 0128-7389
Corresponding Author: shahrum@eng.ukm.my

COMPARISON IN BETWEEN GOOD AND OXIDIZED LEADFRAME: A CASE STUDY IN PACKAGE DELAMINATION ANALYSIS

S. Abdullah, M. F. Abdullah, A. K. Ariffin, M. N. Baharin, Z. A. Aziz and M.F. Mod Yunoh
Faculty of Engineering, Universiti Kebangsaan Malaysia,
43600 UKM Bangi, Selangor

ABSTRACT

The new electrical conductive material, copper alloy, C194 in situ composite, has been developed for the application to leadframe, high field magnet and trolley wire. This material has a low cost, high thermal and electrical conductivity, easy fabrication and joining, and also has a wide range of attainable mechanical properties. In C194, copper is one of the core materials in producing leadframes, interconnection wires, heat sinks and foils for flexible circuits in electronic packaging. Copper oxidation is considered as a serious reliability problem in microelectronic package. Unlike aluminum oxide, the copper oxide layer is not self-protected which could lead easily to the oxidized condition. This study focused on copper leadframe which consist two types of condition, good and oxidized since good leadframe and oxidized leadframe have a different structure and composition. Both leadframe were applied in Quad Flat No-Lead (QFN) package. It was found that oxidized leadframe has a negative effect on package reliability. It will produce cracks at Cu-Al interface on the copper interconnection wire that will causes delamination between the leadframes die pad and molding compound. It also induces poor adhesion between the copper leadframes and molding compound.

http://journal.masshp.net/wp-content/uploads/Journal/2008/Jilid%202/S.%20Abdullah%20223-231.pdf

REFERENCES

[1]. Zheng, Y. (2003). Study of Copper Applications and Effects of Copper Oxidation in Microelectronic Package. In Partial Fulfillment of MatE 234.
[2]. Lanford, W.A., Ding, P.J., Wang, W., Hymes, S. & Murarka, S.P. (1995). Alloying of copper for use in microelectronic metallization. Materials Chemistry and Physics, Vol 41, pp 192-198.
[3]. ASM International. (1989). Electronic Materials Handbook, Vol. 1. pp 1-1140.
[4]. ASM international. (1987). ASM handbook, Corrosion. 9th ed. Vol. 13. pp 610-640.
[5]. Horvath, Z.E., Peto, G., Paszti, Z., Zsoldos, E., Szilagyi, E. & Battistig, G. (1999). Enhancement of oxidation resistance in Cu and Cu(Al) thin layer. Nuclear Instruments and Methods in Physics Research B 148.
[6]. Budinski, K.G. & Budinski, M.K. (2005). Engineering Materials properties and selection. 8th. Pearson Prentice Hall.
[7]. Tan, C.W., Daud, A.R. & Yarmo, M.A. (2002). Corrosion Study at Cu-Al Interface in Microelectronics Packaging. Applied Surface Science 191.