ECF Paper 44/2004
For Discussion

Project 23/2003 – Lead-free Sn-Zn Solder Interconnects for Green Electronics Manufacturing

Purpose

This paper seeks Members' advice in funding the captioned application for ECF made by the City University of Hong Kong (CityU).

Background

2. The funding requested by this project is $1,332,620.00. The project requires one Senior Research Assistant and one supporting staff. The staff cost for two research staff amounts to $721,620.00. The remaining $611,000.00 is for purchase of equipment and consumables and instrumentation charges. The project is expected to last for 3 years.

3. Lead-containing solders have been widely used as low temperature joining alloys for some time because of their good combination of process attributes, properties and cost. However, concerns about lead toxicity have resulted in the ban of lead-containing solders for use in water piping, food and beverage cans, and automobile bodies. In the electronics industry, the main concern regarding lead-containing solders arises from the ultimate disposal of solder-containing devices in landfills when the recycling of electronics components is not properly practiced. As such, the European Commission has decided to ban lead-containing soldering from 1.7.2006 onwards.

4. The objective of this particular project is to study the mechanical (fatigue, creep and shear) properties of the Sn–9% Zn eutectic alloy at an elevated temperature (85°C), under both dry and moist conditions and also under conditions of thermo mechanical cycling that simulate on/off circuit behavior. The data provided by this project will be important in addressing concerns by electronics companies about potential degradation of this solder alloy through zinc oxidation. Using Sn-Zn based solder paste can readily eliminate the danger of oxidation; however, data are needed concerning long-term electrical and mechanical properties to prove this.

5. The proposal was examined by EMSD, EPD and two external expert reviewers. EMSD considered the proposal worthy of support. EPD

considered the proposal carry little environmental implications with respect to the production, treatment, disposal and recycling issues in the local context. EPD considered it more appropriate for the project proponent to seek support from other funding agencies.

6. In respect of the assessment from the two external expert assessors, the first one considered the project deliverables too late to help the industry, while the second assessor considered the proposal worthy of support and the deliverables are genuinely needed. Nevertheless, the second assessor recommended reducing the length of the study from 3 to 2 years but the principal investigator (PI) considered the length of study of 3 years is minimum. Detailed comments from the two assessors and response from the PI are attached.

Advice sought

7. Members are invited to advise whether the application for ECF should be supported with an approved grant of $1,332,620.00 as detailed in paragraphs 2 to 4 above.

Secretariat, ECF Research Projects Vetting Subcommittee
January 2005