Contribution ID: **357** Type: **Poster Presentation**

Microstructural Characterization of Sub-micron Copper Powder Consolidated by Spark plasma sintering for Heat Sink.

Tuesday, 9 July 2013 17:40 (1 hour)

Abstract content
   (Max 300 words)

Abstracts
Semiconductor electronics industry has made considerable advancement over the last decade. Meanwhile, the essential requirements of heat sink among all types of components in all electronics system remain unchanged because electronics component need to dissipate power densities. In electronic systems, heat sinks are devices that cool the hotter body by dissipating the heat and this heat is conveyed out of the component by air to avoid the problem of overheating. With the increasing performance and packing density required in microelectronic devices, copper has shown to be a material of choice for thermal management due to its attractive properties of high conductivity of 385 W/m-K) and low electrical resistivity of 1.67μΩ-cm (Lanford et al., 1995; Chai and Chen, 2010). Despite the attractive thermal management properties of Cu achieving full densification of this material is still a challenge due to the oxidation of copper at room temperature. Powder metallurgy is a promising method of fabricating copper and copper composites due to its good densification and ease of operation with cost effective. Spark plasma sintering technique is a short time sintering process where powder particles are compacted by uniaxial pressing and heating simultaneously. This study presents characterization of Cu fabricated by spark plasma sintering for thermal management in microelectronics packaging. The microstructure of the Cu powders will be investigated using high resolution scanning electron microscopy (HRSEM). Phase present will be investigated with X-ray diffraction (XRD) analysis. Density, porosity, electrical resistivity, thermal conductivity will be measured to evaluate the performance of sintered samples.

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Level for award
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PhD

Main supervisor (name and email)
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Dr P. A Olubambi

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No

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Session Classification: Poster1

Track Classification: Track A - Division for Condensed Matter Physics and Materials