日本金属学会九州支部・日本鉄鋼協会九州支部

第 326 回材料科学談話会

九州大学超顕微解析研究センター、微細構造解析プラットフォーム「ナノマテリアル開発のための超顕微解析共用拠点」、九州大学超顕微科学リサーチコア 共催

第 210 回ＨＶＥＭ研究会
のお知らせ

平成２８年１１月２８日

英国 Imperial College London の Christopher Gourlay 博士、ならびにマレーシア Universiti Malaysia Perlis の Mohd Arif Anuar Mohd Salleh 博士をお招きし、下記のように講演会を開催致します。皆様奮ってご参加ください。

【日　　時】平成２８年１２月９日（金）　１４時００分 ～ １６時３０分

【会　　場】九州大学　伊都キャンパス　超顕微解析研究センター（CE21）セミナー室
（〒810-0395　福岡県福岡市西区元岡７４４番地）

【講演１】　**Dr. Christopher Gourlay**,
Department of Materials, Imperial College London
『Intermetallic Crystal Growth Mechanisms: Application to Cu_6Sn_5 in Solder Joints』

【講演２】　**Dr. Mohd Arif Anuar Mohd Salleh**,
The Center of Excellence Geopolymer and Green Technology,
Universiti Malaysia Perlis (UniMAP)
『Microstructure Formation in Reinforced Sn-Cu Lead-free Solder Alloys』

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交通手段の詳細や当研究会についてのお問い合わせは、下記の連絡先にお願いいたします。
各講演の概要と会場へのアクセスを次ページ以降に示します。

材料科学談話会世話人：波多　聰
ＨＶＥＭ研究会世話人：安田和弘・佐藤幸生・波多　聰
連　　絡　　先　：安田和弘（九州大学　工学研究院　エネルギー量子工学部門）
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Abstract

【講演１】

Intermetallic Crystal Growth Mechanisms: Application to Cu_6Sn_5 in Solder Joints

Most alloys produced by solidification processing contain intermetallic compounds (IMCs), which can range from impurity phases to strengthening phases or reaction phases in the joining of dissimilar metals. If these IMCs are large, they are usually detrimental to mechanical properties and, therefore, it is important to be able to control their nucleation and growth to control their size. This talk will overview the solidification of Cu_6Sn_5, an important IMC in electronic interconnections, with a focus on nucleation and growth mechanisms.

The solidification of primary Cu_6Sn_5 is studied in Sn-Cu alloys and solder joints by combining EBSD, FIB-tomography and synchrotron radiography. It is shown that the composition and process parameters can lead to a rich variety of growth forms including faceted hexagonal rods growing along [0001] bounded by $\{10\bar{1}0\}$ facets, in-plane branched faceted crystals and nonfaceted dendrites which branch along <405> in the $\{10\bar{1}0\}$ planes. This range of growth morphologies is then rationalised into a kinetic microstructure map and the faceted to nonfaceted growth transition is discussed in terms of changing atomic attachment mechanisms. Finally, it is shown that the full range of Cu_6Sn_5 morphologies that grew for different composition and cooling rate combinations in bulk alloys can be engineered to grow in solder joints made with a single composition (Sn-0.7wt%Cu/Cu) by altering the peak temperature and the cooling rate.

【講演２】

Microstructure Formation in Reinforced Sn-Cu Lead-free Solder Alloys

Electronics manufacturers are pushing the limits in reducing the physical size of circuitry while simultaneously increasing the number of transistors to satisfy Moore's Law. This includes investing in new materials in electronic packages with a focus on high reliability. A viable method to enhance the properties and performance of solder joints is the incorporation of reinforcement particles to the solder matrix, either by intrinsic or extrinsic methods. In this study, a series of Sn-Cu Pb-free solder alloys were manufactured with a variety of reinforcing phases and the microstructure and soldering behavior were investigated in detail using advance characterisation techniques such as in-situ synchrotron X-ray radiography imaging. Shear strength of the reinforced solder joints was also evaluated. The collective results of this study demonstrate a detailed understanding of the manufacture of reinforced Sn-Cu Pb-free solder alloys and the mechanisms of microstructure development.

九州大学へのアクセスマップ。会場は伊都キャンパスにあります。

伊都キャンパスマップ。会場の建物は㊵(CE20)です。