

講題: 相圖與應用: 電子軟鐳與熱電材料

時間: 2016 年 12 月 23 日 15:30~17:20

演講摘要:

相圖是敘述材料相平衡的最簡潔工具。對相關材料的設計開發、製程選擇與產品可靠度評估十分重要。相圖可以由實驗與計算得知，Calphad (Calculation of Phase Diagrams) 方法是目前最主要相圖計算的方法。電子軟鐳是電子產品中最常見的連接方法，鐳點的品質與電子產品的性質與可靠度息息相關。從傳統的軟鐳、覆晶到直通矽晶穿孔等技術，軟鐳技術應用的面向愈來愈廣，對電子產業也更加的重要。熱電模組可以將廢熱回收產生電力，進而提升能源使用效率；也可以和太陽加熱系統並用，成為再生能源。因為在能源應用上的重要潛力，熱電材料與元件吸引了許多的研究與探討。本演講將介紹相圖之基本知識、與相圖的測定方法，並以電子軟鐳與熱電材料系統做為相圖闡述的對象。

講者: 陳信文 博士 (國立清華大學特聘教授兼副校長)

簡歷:

陳信文博士是國立清華大學化工系的特聘教授兼任(學術)副校長。陳教授為 University of Wisconsin-Madison 的博士，畢業後先任職於美國鋁業公司研發中心，隨後於 1992 年回到國立清華大學擔任教職。曾任國立清華大學化工系系主任、學務長、代理共教會主委、教務長、全球事務長等職，曾任國科會(科技部)化工學門召集人與台灣化工學會「化工」雙月刊總編輯。

陳教授的學術專長在於材料相平衡與熱力學，所探討的材料包括了熱電材料、電子軟鐳材料與鋁合金。陳教授發表了 190 篇以上的國際期刊論文、80 篇以上的報刊評論與獲得十項專利，是 Journal of Electronic Materials 之 associate editor，與 Journal of Phase Equilibria and Diffusion 的合金相圖委員會委員。陳教授與曾為 TMS 合金相(Alloy Phase)委員會主席、美國 Lehigh University、法國 Ecole Polytechnique de l'universite de Nantes、與美國 University of Wisconsin-Madison 的客座教授。他是亞太材料學院(APAM)院士、美國金屬學會(ASM)會士、中國材料科學學會(台灣) (MRS-T)會士與台灣化學工程師學會 (TICHE) 會士。



個人照: 陳信文

Time & Topic:

15:30~17:20, December 23rd, 2016; 「Phase diagrams and applications: electronic soldering and thermoelectric materials」

Abstract:

Phase diagrams contain condensed materials phase equilibrium information. They are fundamentally important for materials processing routes determinations and products' reliability assessment. Phase diagrams can be determined by experimental measurements and calculations. Calphad (Calculation of Phase Diagrams) is the primary method for phase diagram calculation. Electronic soldering technologies, including conventional soldering, flip chip and through silicon via, are among the most important joining technologies. The properties of these numerous solder joints in electronic products are critical to their properties and reliability. Understanding and development of electronic soldering is crucial for the electronic industry. Thermoelectric devices enable direct conversion between thermal and electrical energy, and energy usage efficiency can be improved through waste heat recovery. Furthermore, thermoelectric together with solar module is a promising renewable energy source. Development of renewable energy and enhancement of efficiency are the two primary concerns and research efforts of energy-related studies. Thermoelectrics are thus of high interests to energy community. This talk introduces phase diagrams, and looks into their applications in electronic soldering and thermoelectrics.

Speaker's Bio:

Dr. Sinn-wen Chen is the Senior Vice President and Distinguished Professor of National Tsing Hua University in Taiwan. He received his Ph.D. degree in Materials Science from the University of Wisconsin-Madison, joined the Alcoa Technical Center, then he took a faculty position in the Chemical Engineering Department in National Tsing Hua University in 1992.

He has been working on phase diagram determinations of electronic solders and thermoelectric materials. He is the author and co-author of 190 scientific journal papers, 80 newspaper comments and 10 patents. He is an associate editor of the JEM, a committee member of Journal of Phase Equilibria and Diffusion, and was the chair of TMS alloy phase committee. Prof. Chen was a visiting professor to Lehigh University, Ecole Polytechnique de l'universite de Nantes, and Univ. of Wisconsin-Madison. He is an Academician of the Asia Pacific Academy of Materials and a fellow of ASM International, Materials Research Society-Taiwan and Taiwan Institute of Chemical Engineers.



Photo: Sinn-wen Chen