IEEE Electronic Packaging Society (EPS) Webinar
June 26th, 2024, 10:00AM~11:00AM Eastern Time

Recent Advances on Cu-Cu and Hybrid Bonding for Advanced Packaging Platforms and Applications

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Registration link:
https://ieee.webex.com/webappng/sites/ieee/meeting/register/31ffbbcef3c545f1bbac9524203dae94?ticket=4832534b00000007bf8e9ce52047ed89d5fc4bb374490d0311b6beb53a13907eb3780056d5a7114b&timestamp=1717681347015&RGID=ra64d5c35bc5e53b1b16035b704f3ed2a

Abstract: Bonding technology is the key to the success of vertical stacking in 3D integration, heterogeneous integration, and advanced packaging applications. Furthermore, developing a bonding technology which can be performed at low temperature becomes significant to avoid the concerns of low thermal budget, low mechanical stress, and high reliability in many applications. Among various bonding technologies, bumpless Cu-based hybrid bonding has become the main solution to the requirement of high speed and density since Cu has its excellent electrical performances, thermal properties, and readiness in the backend and packaging fabrication, as well as cost consideration.

This talk will describe the history and advances of current Cu-Cu bonding, including technology development and solutions of low temperature Cu-Cu bonding. A wetting/passivation technique for room temperature Cu bonding and its mechanism will be presented. Next, hybrid bonding, an enabling technology for fine pitch/size bonding in multiple 3D integration and advanced packaging applications, will be mentioned with its history development. Current Status, challenges and their solutions, such as fine pitch, warpage, and mechanical and thermal stress, to reach hybrid bonding will be discussed. Finally, applications and recently developed platforms based on hybrid bonding will be introduced.

Biography: Dr. Kuan-Neng Chen is Chair Professor at the Institute of Electronics at the National Yang Ming Chiao Tung University (NYCU) in Taiwan. He received his Ph.D. degree in Electrical Engineering and Computer Science, as well as his M.S. degree in Materials Science and Engineering, both from the Massachusetts Institute of Technology (MIT). Dr. Chen has held several prominent positions including Vice President for International Affairs and Associate Dean of the International College of Semiconductor Technology at NYCU, Program Director of the Micro-Electronics Program at the National Science and Technology Council in Taiwan, and Research Staff Member at the IBM Thomas J. Watson Research Center.
Dr. Chen has received numerous awards and honors throughout his career, including the IEEE EPS Exceptional Technical Achievement Award, the IMAPS William D. Ashmon – John A. Wagnon Technical Achievement Award, the National Industrial Innovation Award, the MOST/NSTC Outstanding Research Award (twice), the MOST/NSTC Futuristic Breakthrough Technology Award (twice), the Pan Wen Yuan Foundation Outstanding Research Award, the CIE Outstanding Professor Award, the CIEE Outstanding Professor Award, and the IBM Invention Achievement Awards (5 times). He is the author of over 300 publications, including 3 books and 7 book chapters, and holds 87 patents. Dr. Chen has also served as a Guest Editor for the MRS Bulletin and IEEE Transactions on Components, Packaging, and Manufacturing Technology, and has held leadership roles in various conferences and committees, such as IEEE IITC General Chair. Dr. Chen is a Fellow of National Academy of Inventors (NAI), IEEE, IET, and IMAPS, and a member of Phi Tau Phi Scholastic Honor Society.

Additionally, Dr. Chen holds the position of Specially Appointed Professor at the Tokyo Institute of Technology (Tokyo Tech) and serves as an Adjunct R&D Director at the Industrial Technology and Research Institute (ITRI). His current research interests focus on three-dimensional integrated circuits (3D IC), advanced packaging, and heterogeneous integration.

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