

Novel conductive adhesive films materials for electronics packaging applications

Kyung W Paik

Korea Advanced Institute of Science and Technology, Korea

Due to the increasing demand for higher performance, greater flexibility, smaller size, and lighter weight in portable, wearable, and display electronic products, there have been growing needs of various electronic packaging products and interconnection technologies now and in near future. To realize various portable, wearable, and display electronic products, ultra-fine pitch and flexible packaging & interconnection technologies are needed. As one of the promising ultra-fine pitch and flexible interconnection technologies, electrically conductive adhesive films materials such as ACFs (Anisotropic Conductive Films) and NCFs (Non-Conductive Films) are widely used. However, ACFs have two technical limitations such as ultra-fine pitch and current handling capability. For ultra-fine pitch applications, novel Nano-fiber ACFs and APL (Anchoring Polymer Layer) ACFs have been successfully invented by KAIST for less than 20-micron pitch COG (Chip on Glass), COP (Chip on Polymer), and COF (Chip On Flex) applications. In addition, for high current handling applications, new solder ACFs have been also newly introduced by KAIST to replace the conventional metal particles based ACFs materials.

By solder ACFs, 30% lower contact resistance, 4X higher current handling capability, and excellent reliability were successfully achieved compared with conventional ACFs. Furthermore, ACF interconnection method can provide the excellent flexible interconnect solution for OLED COP and COF/CIF (Chip in Flex) packages to realize totally wearable electronic products.

Recently new interconnection materials, NCFs, are introduced for stacking semiconductor chips in 3-dimensional (3-D) way using the TSV (Through Silicon Via) technology. In the 3D-TSV vertical interconnection, Cu pillar/Sn-Ag eutectic solder bump combined with NCFs materials are the most promising bonding and interconnection method. Recent HBMs (High Bandwidth Modules) used as high-speed memory modules for AI (Artificial Intelligence) and Cloud computing have been packaged by NCFs materials. In this presentation, the novel ACFs materials for various ultra-fine pitch interconnection and the NCFs for 3D-TSV chip stacking applications will be introduced.

e: kwpaik@kaist.ac.kr



Notes: