MEDIA RELEASE

INSTITUTE OF MICROELECTRONICS KICKS OFF COPPER WIRE BONDING CONSORTIUM II TO TACKLE COPPER INTERCONNECTS RELIABILITY ISSUES

1. Singapore, 25 March, 2013 -- The Institute of Microelectronics (IME), a research institute of the Agency for Science, Technology and Research (A*STAR) in Singapore, has launched the Copper (Cu) Wire Bonding Consortium II. The consortium which rides on the successes of Phase I launched in 2010 aims to improve the reliability of semiconductor devices by tackling copper wire bonding issues related to corrosion and stress. Members of this consortium span across the semiconductor supply chain including Atotech S.E.A., GLOBALFOUNDRIES, Heraeus Materials and Infineon Technologies.

2. Copper, which offers favorable cost, performance, quality and reliability benefits over gold, has become one of the preferred materials for wire bonding interconnects in microelectronics. Today, however, the industry still faces many technical challenges in developing copper as the best choice for chip-to-package interconnection. One of the key technical issues is related to copper's hardness relative to gold, which requires bonding parameters to be very well controlled in order to eliminate the risk of damaging bond pads and underlying structures. Another daunting challenge of using copper is its reactivity with oxygen in the surrounding air which causes corrosion-related problems. These two issues can affect the reliability and quality of semiconductor devices.

3. Against this background, the IME Cu Wire Bonding Consortium II will conduct a study on corrosion and the mechanisms on the effect of various packaging materials. To understand the effects of copper wire hardness when bonding on different materials, the consortium will carry out modeling and characterization of copper wire bonding

stress using stress sensors developed under the scope of Phase I of the Cu Wire Consortium to provide an improved technique of measuring wire bonding stress. The outcome of this work will enable semiconductor manufacturers as well as test and packaging houses to develop solutions to improve product reliability, especially those targeted at high reliability applications.

4. "IME has been dominant in the R&D of advanced packaging technologies and remains focused on developing solutions to help the industry reduce manufacturing costs," said Prof. Dim-Lee Kwong, Executive Director of IME. "We are excited to begin a new phase of the Cu Wire Bonding Consortium to enable the development of robust, high reliability and low cost interconnection solutions."

5. "GLOBALFOUNDRIES is pleased to be in this consortium as the first phase of our partnership has successfully resulted in optimizing 0.7 mil in copper wire bonding on our 40nm product and passed the JEDEC reliability test," commented Mr. K. C. Ang, Senior Vice President and General Manager for GLOBALFOUNDRIES Singapore. "The success has brought us to the next phase of collaboration where the process will be tested on our advanced 28nm product. We see this industry collaboration truly augmenting the value proposition we have on offering quality and cost effective wafer manufacturing to our customers."

6. "Infineon has been part of the Copper Wire Bonding Consortium since it first launched in 2010," said Mr. Guenter Mayer, Senior Director, Package Technology and Innovation, Infineon Technologies Asia Pacific. "Today, our interest lies in copper wire bond interconnect performance and reliability in semiconductors that can meet the stringent quality requirements of Automotive and Industrial applications."

7. "Being a member of the consortium enables Heraeus to work with strong industry partners and research institutes in order to have more in-depth understanding of wire bond reliability. The consortium members are of various backgrounds, such as wafer manufacturers, mold compound manufacturers and end users. The wafer

manufacturers design pad structures that cater for the harder copper wire which created challenges on 1st bond mechanical stress during bonding and package reliability due to corrosion. Other partners are mold compound manufacturers and end users who can equally contribute to materials and assessment on best combination of package design, materials and application solution," said Mr. Bernd Stenger, Executive Vice President, Contact Materials Division, Heraeus Materials Technology.

About Institute of Microelectronics (IME)

The Institute of Microelectronics (IME) is a research institute of the Science and Engineering Research Council of the Agency for Science, Technology and Research (A*STAR). Positioned to bridge the R&D between academia and industry, IME's mission is to add value to Singapore's semiconductor industry by developing strategic competencies, innovative technologies and intellectual property; enabling enterprises to be technologically competitive; and cultivating a technology talent pool to inject new knowledge to the industry. Its key research areas are in integrated circuits design, advanced packaging, bioelectronics and medical devices, MEMS, nanoelectronics, and photonics. For more information about IME, please visit http://www.ime.a-star.edu.sg.

About Agency for Science, Technology and Research (A*STAR)

The Agency for Science, Technology and Research (A*STAR) is the lead agency for fostering world-class scientific research and talent for a vibrant knowledge-based and innovation-driven Singapore. A*STAR oversees 14 biomedical sciences, and physical sciences and engineering research institutes, and seven consortia & centre, which are located in Biopolis and Fusionopolis, as well as their immediate vicinity. A*STAR supports Singapore's key economic clusters by providing intellectual, human and industrial capital to its partners in industry. It also supports extramural research in the universities, hospitals, research centres, and with other local and international partners. Please visit www.a-star.edu.sg

ABOUT GLOBALFOUNDRIES

GLOBALFOUNDRIES is the world's first full-service semiconductor foundry with a truly global footprint. Launched in March 2009, the company has quickly achieved scale as the second largest foundry in the world, providing a unique combination of advanced technology and manufacturing to more than 150 customers. With operations in Singapore, Germany and the United States, GLOBALFOUNDRIES is the only foundry that offers the flexibility and security of manufacturing centers spanning three continents. The company's three 300mm fabs and five 200mm fabs provide the full range of process technologies from mainstream to the leading edge. This global manufacturing footprint is supported by major facilities for research, development and design enablement located near hubs of semiconductor activity in the United States, Europe and Asia. GLOBALFOUNDRIES is owned by the Advanced Technology Investment Company (ATIC). For more information, visit http://www.globalfoundries.com.

About Infineon

Infineon Technologies AG, Neubiberg, Germany, offers semiconductor and system solutions addressing three central challenges to modern society: energy efficiency, mobility, and security. In the 2012 fiscal year (ending September 30), the Company reported sales of Euro 3.9 billion with close to 26,700 employees worldwide. Infineon is listed on the Frankfurt Stock Exchange (ticker symbol: IFX) and in the USA on the over-the-counter market OTCQX International Premier (ticker symbol: IFNNY).

About Heraeus

Heraeus, the precious metals and technology group headquartered in Hanau, Germany, is a global, private company with more than 160 years of tradition. Our fields of competence include precious metals, materials, and technologies, sensors, biomaterials, and medical products, as well as dental products, quartz glass, and specialty light sources. With product revenues of €4.8 billion and precious metal trading revenues of €21.3 billion, as well as more than 13,300 employees in over 120 subsidiaries worldwide, Heraeus holds a leading position in its global markets. The Heraeus Contact

Materials Division is a part of Heraeus Materials Technology. For more than 20 years the Contact Materials Division with its two Business Units Bonding Wires and Assembly Materials has been the leading manufacturer of materials for assembly and packaging technology in the electronics industry.

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