

Dissertation press release

08.01.2019

## Investigation of void formation in 3D-integrated microelectronic interconnects

<b>Title of the dissertation</b>	Intermetallic Void Formation in Cu-Sn Micro-Connects
<b>Contents of the dissertation</b>	<p>The electronics industry is undergoing a fundamental shift in integration technologies, from large volume low density interconnections; for example, from ball grid arrays and wire-bonding interconnects, to low volume high density interconnections such as through-silicon vias, micro-bumps, and solid-liquid interdiffusion bonds (referred to as micro-connects). The shift makes possible greater levels of integration and improved performance with heterogeneous 3D integration, which is the basic infrastructure required in smart sensors for the Internet of Things. With this shift comes new challenges to our understanding of the micro-structural evolution of small volume interconnects and their associated reliability challenges, in particular improved temperature robustness and increased lifetime properties for automotive and industrial electronic applications. An identified reliability challenge of significant importance to Cu-Sn bonding for 3D integration is intermetallic void formation. This thesis seeks to answer the following research questions: (i) Under what conditions do voids form and what effect do voids have on the properties of the Cu-Sn system? (ii) What are the characteristic microstructural and chemical behaviours of the Cu-Sn system that experiences a high voiding propensity? (iii) Is there an alternative model for void formation? (iv) Is it possible to have a completely intermetallic void free microelectronics industry?</p>
<b>Field of the dissertation</b>	Electronics Integration and Reliability
<b>Doctoral candidate</b>	Glenn Ross, M.Sc. (Tech.) Born in Australia, 1982
<b>Time of the defence</b>	01.02.2019 at 12:00 noon
<b>Place of the defence</b>	Aalto University, School of Electrical Engineering, lecture hall AS2, Maarintie 8, Espoo
<b>Opponent</b>	Dr. Joke De Messemaeker, Imec, Belgium Professor Daniel Kiener, Montanuniversität Leoben, Austria
<b>Custos</b>	Professor Mervi Paulasto-Kröckel, Aalto University School of Electrical Engineering, Dept. of Electrical Engineering and Automation
<b>Electronic dissertation</b>	<a href="https://aaltodoc.aalto.fi/handle/123456789/53">https://aaltodoc.aalto.fi/handle/123456789/53</a>
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