T-P22

AEM observation of interfacial reaction layers formed between Sn-3.5Ag solder and ENIG plated Cu substrate

Jee-Hwan Bae, Han-Byul Kang, Jeong-Won Yoon, Seung-Boo Jung, Cheol-Woong Yang

Dept. of Advanced Materials Engineering, Sungkyunkwan University, 300 Cheoncheon-dong, Jangan-gu, Suwon, Gyeonggi-do 440-746, Korea

* E-mail : cwyang@skku.edu

Sn-Pb solders have been the first choice in the electronic industry for packaging applications due to the advantages of the proper mechanical properties, low cost, adequate melting temperature and excellent wetting properties. However, because of health and environmental concerns, international laws have been proposed to limit or ban the use of Pb in manufactured products. Therefore, Pb-free solder has become an important issue for electronic material research, which has led to extensive research and development work. Many different solder alloys have been proposed as potential Pb-free solders and the most promising of these falls into the alloy families of Sn-Ag and Sn-Ag-Cu. The eutectic Sn-Ag solder is one of the most promising Pb-free candidates to replace the Sn-Pb solders. In addition to solder, printed circuit boards (PCBs) and component surface finishes also have to be Pb-free. Electroless Ni has been widely used as a diffusion barrier layer on the Cu bond pad for flip-chip and ball-grid-array (BGA) solder bumps. In this study, we evaluated the interfacial reaction between eutectic Sn-Ag solder and ENIG (Electroless Nickel-Immersion Gold) plated Cu substrate by using analytical electron microscopy (AEM). The microstructure of solder joints has been studied mostly using scanning electron microscopy (SEM). But, a high spatial resolution is required for qualitative analysis because the reaction layers or products of solder joints after reflow are quite thin or small. Therefore, transmission electron microscopy (TEM) becomes one of the most promising analytical methods for this technology. TEM samples were prepared by ultramicrotome. The results on the evaluation of the interfacial reaction will be presented in more detail.