

TEM characterization of backside metal with Ag/Sn/Ag multilayer

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Due to recent developments in the electronics industry, the size of semiconductor devices is becoming smaller and the degree of integration is increasing. As a result, the high-power semiconductor market is growing rapidly. Accordingly, the demand for high temperature solder is expected to increase sharply. The conventional Au-based alloy is expensive, and the Pb-based alloy is toxic. Therefore, there is a need to replace materials that are inexpensive, environmentally friendly, and have excellent interface properties.

In order to solve this problem, the intermetallic compound (IMC) was formed by controlling the thickness of the thin film layer and the die bonding temperature using a multilayer thin film (Ag / Sn / Ag) of a new structure. Then, the intermetallic compound interface was analyzed. For this purpose, the interface characteristics and the composition ratio of the intermetallic compounds were estimated based on the HR-TEM (High Resolution Transmission Electron Microscope) image and the EDS (Energy Dispersive X-ray Spectroscopy) elemental analysis. As a result, We confirmed the feasibility of replacing Au and Pb alloys by applying Ag / Sn / Ag thin film structure.

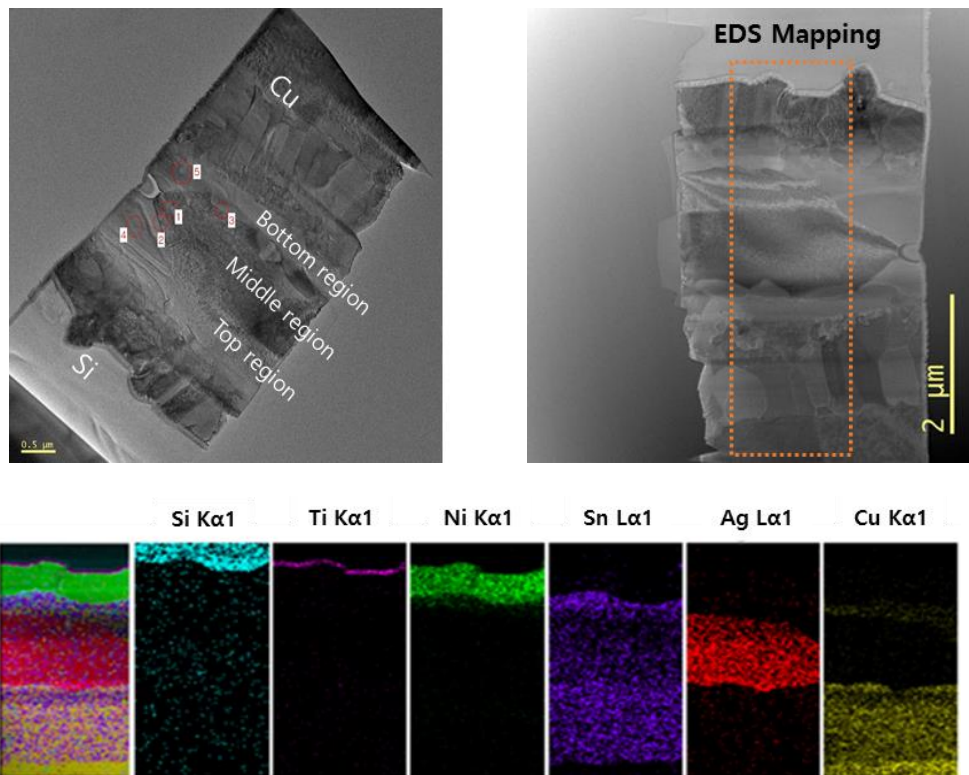


Fig 1. TEM image and EDS mapping after die bonding process

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