

Influence of Ag Precoating on the Solder Joint Properties at the In-Bi Solder-BSCCO Superconductor Interface

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In this study, the effects of the Ag precoating and various surface treatment on the wettability and solder joint at the In-Bi solder and Bi superconductor interface are studied. Ag layer was electroplated on the tube and pellet type BSCCO superconductors as a function of input power. Both the wettability and adhesion strength at the In-Bi solder alloy – Bi alloy superconductor interface improved with Ag precoating. The adhesion strength of the solder alloy-Ag precoated BSCCO superconductor showed 13.3 kg/cm^2 when Ag was electroplated to $5 \text{ }\mu\text{m}$. When the thickness of the Ag coating layer increased to $15 \text{ }\mu\text{m}$, the interfacial adhesion strength increased to 22.1 kg/cm^2 . The wettability at the interface of the solder joint also improved as the thickness of the Ag layer increased. The wetting angle for water on the Ag precoated. The wetting angle for water on the BSCCO surface was 50.0 with $5 \text{ }\mu\text{m}$ Ag precoating. The wettability and adhesion strength of the solder joint also improved as the Ag layers were exposed by plasma. The water was totally spreaded on the Ag coating layer of the pellet when the surface was treated with plasma power of 50W . As the plasma power increased over 100W , the surface of the Ag layer was degraded. The microstructure at the solder joint interface also investigated by SEM and EDX.

keywords : In-Bi solder, Bi superconductor, Ag coating, plasma treatment