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THE EFFECT OF POLYIMIDE IMIDIZATION CONDITION ON ADHESION STRENGTH OF THIN FILM METALS ONTO POLYIMIDE SUBSTRATES., S.H. Yoo and Y.-H. Kim (Dept. of Materials Engineering, Hanyang Univ., Seoul, 133-791, Korea)

Polyimide has been widely applied to the advanced electronic packaging structures such as thin film multichip modules. It is well known that the properties of polyimide depend on the curing condition. In this study, we investigated the effect of polyimide imidization condition on the adhesion strength of thin film metals on polyimide substrates. Thin film metals were deposited onto polyimide substrates by using DC magnetron sputtering. The adhesion strength was measured by 90° peel test. The peel strength of Al thin films onto untreated polyimide was low regardless of the imidization condition. Ar^+ RF plasma treatment increased the peel strength. The peel strength of Al thin films onto plasma treated polyimide was sensitive to the imidization condition. Since Al/treated polyimide specimens fail cohesively in the polyimide, the mechanical properties of the polyimide surface affect the peel strength.

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EUTECTIC PB/SN FLIP CHIP SOLDER BUMP AND UNDER BUMP METALLURGY(UBM) INTERFACIAL REACTION AND ADHESION,Se Young Jang, Kyung Wook Paik (Dept. of Materials Science and Engineering, KAIST, Daejon, 305-701, Korea)

In the flip chip on organic substrate technology using eutectic solder bumps, highly reliable Under Bump Metallurgy(UBM) is required to maintain good adhesion and solder wettability. In this study, interfacial reaction and adhesion property of various UBM structrures such as Al/Ti/Cu5μm, Al/Ti/Cu1μm, Al/Ni/Cu1μm and Al/Pd/Cu1μm for the eutectic 63Sn-37Pb solder were investigated. The effects of numbers of solder reflow and aging time on the growth of intermetallic compounds(IMC) and solder ball shear strength were investigated. Good ball shear strength was obtained with Al/Ti/Cu5μm and Al/Ni/Cu1μm after the heat treatments. In contrast, Al/Ti/Cu1μm and Al/Pd/Cu1μm shows poor shear strength. The decrease of the shear strength was mainly due to the direct contact between solder and nonwettable metal such as Ti and Al resulting in a delamination.

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ANISOTROPIC CONDUCTIVE FILMS WITH AREA-ARRAYED CONDUCTING MICROBUMPS, **M. J. YIM and K. W. PAIK**(Dept. of Mat. Sci. & Eng., KAIST, Taejon, 305-701, Korea)

A novel anisotropic conductive film (ACF) incorporating arrayed metal coated polymer microbumps in an epoxy adhesive resin has been developed. Numbers of round microbumps arrayed in regular pattern are formed on a substrate using photosensitive polyimides. The polymer micorbumps are then electroplated to form metal-coated conductor using electroless nickel plating and a matrix film is formed using adhesive epoxy resins. After removal of solvent, the ACF with arrayed conductive polymer microbumps is obtained. A significant process simplification and cost reduction can be obtained using this new design and process compared with other area-arrayed ACFs. The interconnection properties of the novel area-arrayed ACFs such as contact resistance, current carrying capacity, and reliability are measured for the chip-on-glass (COG) and flip-chip on a organic substrate applications.

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EFFECTS OF TEMPERATURE AND pH OF PLATING SOLUTION ON Ni/Au BUMP FORMATION FOR FLIP CHIP INTERCONNECTION, **SEONGHO JEON** AND JONG-WAN PARK (Division of Materials Science and Eng., Hanyang Univ., Seoul 133-791, Korea)

Electronic packaging technologies have moved from wire bonding method to flip chip method which contains solder ball bumping. Large circuit chip and small number of I/O pads have been satisfied with the economic wire bonding, but for small size and many I/O pads it is not suitable. In this work, Ni/Au bump layer formation for flip chip packaging was investigated. To prevent Al oxidation, Ni is recommended as a good barrier and Au is formed for wettability with solder. Ni formed on Al bond pads by means of electroless plating and Au by immersion. In the formation process, pH and temperature of the plating solution were varied to observe their effects on the bump formation. Bump morphology was analyzed by Optical Microscopy and SEM and chemical composition analyzed by EDS. Plated Ni/Au layers were annealed and the crystal orientation and the electrical resistance of the subsequent bumps were studied.

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