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REVERSIBLE INTERCONNECTION BY USING HYDROGEN STORAGE ALLOY, F.KITAOKA, N. HOSODA, and T.SUGA.(Research Center for Advanced Science and Technology, The University of Tokyo, 6-1,komaba 4-chome, Meguro-ku, Tokyo 153)

Many industrial goods are difficult and almost impossible to take apart, because they are assembled with direct bonding method. Therefore the bonding method which makes disassembly possible is required.Icall this method "Reversible Interconnection." In this study, the method using hydrogen storage alloy(HSA) is suggested. HSA expands and pulverizes when it absorbs hydrogen. When bonding material A and B, HSA is put between A and B.If it is wished to separate A and B, this structure is put in hydrogen(the pressure of 1-2MPa). It is expected that HSA absorbs hydrogen and pulverizes, and so A is separated from B. As aresult of this study, these two fact were ascertained. First, when putting the bulk of HSA between A and B, HSA pulverized after absorbing hydrogen, and consequently A and B separated. Second, the films of HSA were deposited on circuit board. In this case those films expanded and were peeled off from circuit board after absorbing hydrogen.

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VACUUM SEALING METHOD OF FIELD EMISSION DISPLAY USING ELECTROSTATIC BONDING BETWEEN GLASS SUBSTRATES, W. B. CHOI, K. M. LIM, J. S. LEE, H. C. KANG and M. Y. SUNG (Dept. of Electrical Eng., Korea Univ., Seoul 136-701, Korea)

Field emission display (FED) is one of the most promising flat panel displays (FPDs), which requires significantly high vacuum for providing long-term performance and ensuring reliability [1]. In this paper, the glass-to-glass electrostatic bonding is presented for the vacuum sealing of FED. This bonding method is based on the conventional Si-to-glass anodic bonding mechanism [2]. Using r.f. magnetron sputtering method, amorphous silicon layers have been formed on indium-tin oxide (ITO) coated glass substrate. Secondary ion mass spectroscopy (SIMS) analysis was used to confirm the kinetics of glass-to-glass electrostatic bonding. In order to investigate the applicability of this bonding technique to vacuum sealing of FED, the hermetic sealing test of FED panel whose exhausting hole was sealed by this technique was experimented under 10^{-8} torr vacuum level for one week. This technique is suitable for mass production environments since it is capable of high speed sealing and eliminating the out-gassing problem during seal-off process.

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[2] J. B. Lasky, Appl. Phys. Ltt., 48, 78-80 (1986)

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The Effect of CuO/Cu2O Ratio on Copper/EMC Interface Adhesion of Oxidized Lead Frame Alloys in Packaging Process Temperature, T.G. Kang, I.S. Park, and Y.G. Kim (Package Technology Team, LG Semicon. Co., Ltd., Cheong-Ju, Korea 360-480)

As high speed and power devices require excellent electrical properties, high thermal conductivity and cost effectiveness, etc., Copper leadframe is getting into the linelight. However, it is susceptible to thermal oxidation which degrades device reliability when exposed the elevated temperature while being packaged.

The experimental results show that the adhesion of copper leadframe and epoxy molding compound(EMC) is seriously affected by CuO/Cu2O ratio, alloy composition and oxidation condition. The oxidation thickness of copper-chrome alloy system is thicker than copper-nickel system while the former having higher Cu/EMC interface adhesion than the later. The adhesion property of copper was affected by CuO/Cu2O ratio rather than oxide thickness. On the range of oxide ratio became suit for 0.2 ~ 0.3, high adhesion strength could be obtained regardless of leadframe materials and oxidation time. This facts might be caused by segregation effect of hardening particles at oxide/leadframe interface. The oxide qualities are analyzed with XPS, coulombmetric reduction method, EPMA and SEM.

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CALCULATION OF INTERFACIAL FRACTURE ENERGY IN THE PEEL TEST, Y. B. PARK and I. S. PARK, JIN YU (Dept. of Mat. Sci. and Eng., KAIST, Taejon, 305-701, Korea)

The peel test has been widely used as a mechanical test that measures interfacial fracture energy in various applications such as electronic packaging and thin film technology. However, extensive plastic deformation occurs during the peel test, and the peel strength does not truly represent the interfacial fracture energy because the measured value includes not only the debonding energy of the interface but also the energy necessary for the plastic deformation of the film due to severe bending. In the present work, the plasticity effect in the peel test was studied for a Cu/Cr/Polyimide system where the effects of Cu film thickness and the Cr/Polyimide interface energy on the peel strength were studied by varying the film thickness an the pretreatment condition of the Polyimide surface by RF plasma, respectively. And the three different methods are applied to obtain the interfacial fracture energy. The first is a recently developed theoretical analysis based on the elasto-plastic slender beam theory and the elastic beam on an elastic foundation theory. The second is to apply a simple mechanics on the peel test geometry using FEM and known fracture mechanics solutions of thin film structure. And the last is using the X-ray peak broadening results of peeled metal film and the elasto-plastic beam bending theory. Finally, each interfacial fracture energy calculated from three different methods is compared each other and the differences and limits of each method are discussed.

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