

High adhesion coatings on polymer films for FPCB

Meet the challenge for Cu adhesion on polymer films with the novel non-conducting tie coats from the Fraunhofer-Gesellschaft.

Characteristics

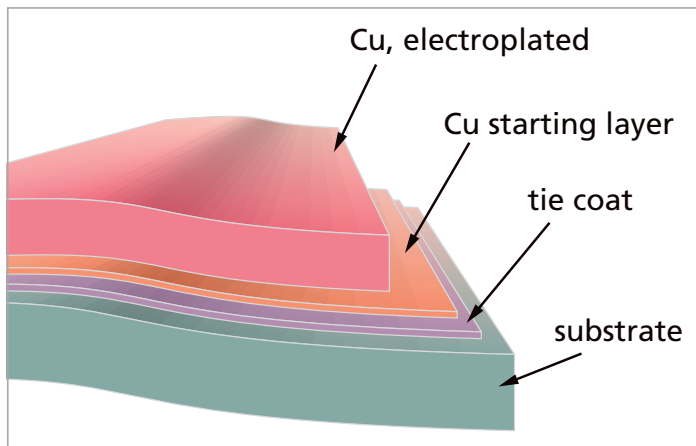
It is a constant challenge to adhere inorganic layers to flexible polymers. Innovative process technologies of the Fraunhofer FEP and Fraunhofer IAP now allow the production of novel, non-conducting tie coats for manufacturing substrates for flexible electronic components. The layers have extremely high adhesion strength when measured in accordance with IPC 650. Minimization of the environmental impact was given high priority in our development work, and hence the use of chromium was completely avoided.

Technology

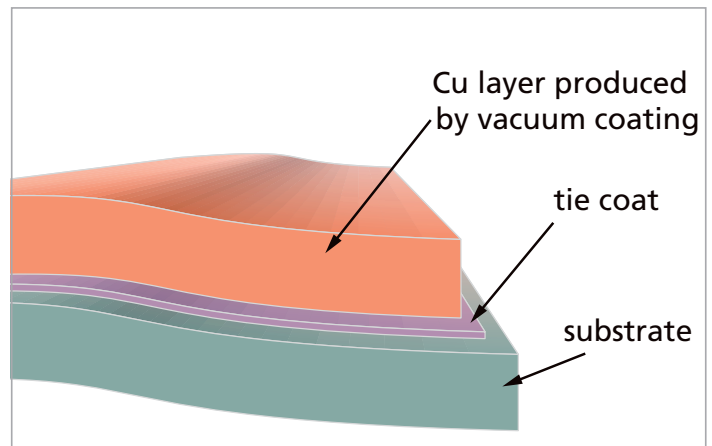
As an alternative to producing metallized substrates using atmospheric pressure processes, the exclusive use of vacuum processes is also possible. Electroplating processes can then be completely avoided. High coating rates and high productivity are achieved by using an innovative combination of environmentally-friendly vacuum coating processes such as sputtering and thermal evaporation. The utilization of roll-to-roll processes is of course possible here.

Applications

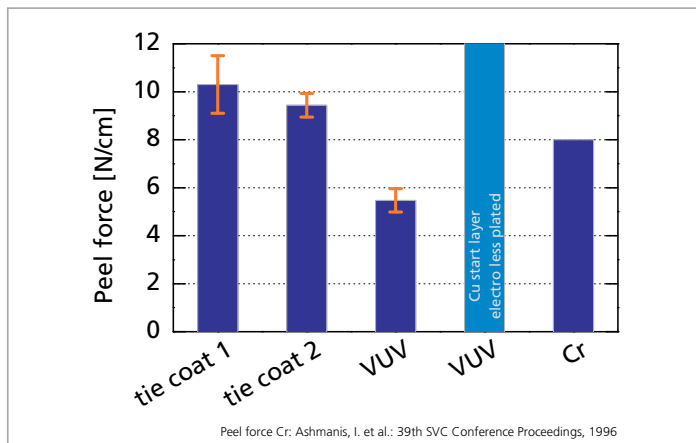
The metallized polymer substrates, such as polyimide or PEEK, are the starting materials for flexible printed circuit boards (FPCBs) and RFIDs. The flexibility of the coated substrates and the low weight allow high freedom of unit design. Furthermore, space can be saved when connecting electric and electronic components. Flexible sensors for use in the areas of life science and biotechnology are also possible, and these can for example be integrated into clothing.



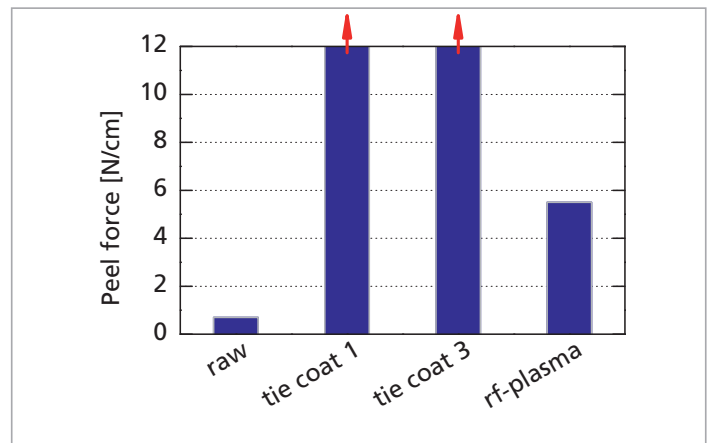
Typical structure of substrate material for FPCBs produced by a combination of vacuum and electroplating processes



Structure of substrate material for FPCBs produced using exclusively clean vacuum processes, without electroplating



Adhesion of copper on polyimide with different tie coat materials or VUV pretreatment; copper starting layer made by sputtering, or alternatively electroless plating; final copper added by electroplating



Adhesion of copper on polyimide with different tie coat materials or plasma pretreatment; whole copper layer produced by evaporation; peeling off the copper layer was not possible with tie coat 1 or 3

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