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フッ酸処理によるポリイミドフィルム／めっき皮膜間の密着性向上

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Improvement of Adhesion Strength between Polyimide and Plated Film by Hydrofluoric Acid Treatment

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概要　無電解Niめっきによるポリイミド（PI）上のシード層形成方法において，無電解Niめっき工程より前のいずれかの工程でPIをフッ酸に浸漬処理することで，密着強度が大幅に向上した。処理によりPI表面に粗さの増加や化学組成変化はなく，PI／シード層接合界面にも変化は現れなかった。しかし，めっき皮膜を引き剥がしたシード層側には多量のPIが付着しており，フッ酸処理の有無で引き剥がし界面が変化していた。さらに，処理後のPIでは色調変化や貯蔵弾性率の増加が確認され，PI自体の機械的物性が変化していることが明らかとなった。フッ酸処理による密着性向上効果は，弾性理論に基づいたPIの物性変化によるものと考えられた。

Abstract

When forming a seed layer on polyimide (PI) film using electroless nickel plating, the adhesion strength between the layer and the film was improved by a hydrofluoric acid dip at any stage of the plating process prior to the electroless nickel plating. No increase in the roughness nor change in the chemical composition of the PI surface was observed after the treatment. Furthermore, no change appeared at the boundary of the PI film and the seed layer. However, peeling of the plated film exposed a large amount of PI adhering on the seed layer indicating a change in the boundary by the treatment. In addition, Dynamic Mechanical Analysis of the PI film before and after the treatment indicated an increase in the storage elastic modulus of the film. The color tone of the film was also changed by hydrofluoric acid treatment. Based on a theory of elasticity, a change in the mechanical properties of the resin made to adhere to metal has an influence on peel strength. The authors concluded that the change in the mechanical properties of the PI film due to the hydrofluoric acid treatment improved the peel strength.

Key Words: *Polyimide*, *Metalize*, *CCL*, *Seed Layer*, *Hydrofluoric Acid*