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Preparation and Property Evaluations of Liquid Non-Solvent Solder Resists which Can be Developed with Alkaline Solution

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液状無溶剤型アルカリ現像ソルダーレジスト材料特性と評価結果

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概要　プリント配線板用アルカリ現像型ソルダーレジストの環境対応として，溶剤を含まない非接触露光方式の材料を検討した。光硬化速度の速いラジカル重合系は酸素による重合阻害を起こし易いが，アルカリ可溶性樹脂の光硬化性について検討した結果，光重合開始剤とチオキサントン，アミンを併用することにより表面および内部ともに良好な硬化性を得た。

今回の組成物を作製するにあたり，後から混合するエポキシ樹脂について，固形および液状タイプのものを評価した結果，密着性が良好で，260°C 30 秒のはんだ耐熱性を有し，100 μm 以下の解像性が得られ，液状無溶剤型であっても一般配線板用途向けに適用可能な材料を作製できることが示された。

Abstract

Solder resist materials which do not contain solvent as a component and can be applied to off-contact exposure method were studied for their application to alkaline-developable solder resists of printed circuit boards. We found a photopolymerization initiator system composed of photoradical initiator, amine and thiaxanthone which showed good curability both on the surface and in the interior under aerial condition. We also succeeded in preparation of alkaline-developable photosensitive resin by two-step reactions starting from novolac-type epoxy resin.

Effect of solid and liquid epoxy resin components added for thermal post-curing on properties as solder resist was also examined. As a result, regardless of the epoxy component, the solder resists having good adherence, high solder heat resistance of 260°C for 30 s and resolution of 100 μm or higher were successfully obtained. These results demonstrate that a solder resist which is developable with alkaline solution and applicable to printed circuit boards for general uses can be produced from liquid photosensitive resins without solvent component.

Key Words: *Solder Resist, Non-solvent, Developable with Alkaline Solution, Novolac-type Epoxy Resin, Photopolymerization Initiator*