

Kitakami River Basin Area

Research and development into high performance organic nano membrane triazine thiol

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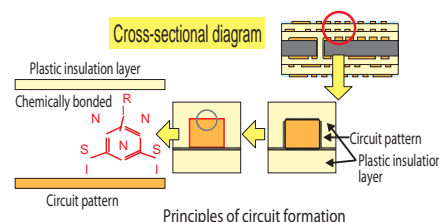
Core Research Organization
Iwate University

Major Participating Research Organizations
Industry... Toadenka Co. Ltd., Nippon Chemi-Con Corp., KM ACT Ltd., Toany Co. Ltd
Academia... Iwate University
Governmen... Iwate Industrial Research Institute, Iwate Industrial Promotion Center

Typical result of City Area Program

1. The establishment of a new method of production for high density build-up circuit boards

The general method of producing the circuit pattern for printed circuit boards involves exposing the smooth surface of copper foil to etching treatment, allowing adhesion with the epoxy resin circuit board. However, in this research and development program, a high performance organic nano membrane (a derivative of triazine thiol) has been applied to the surface of the epoxy resin circuit board, thus establishing a new high- adhesive technique that renders the etching process obsolete. In comparison with former production techniques, there is a large-scale decrease in the environmental burden and cost of production. Trial manufacture has been successful in producing high density build-up circuit boards capable of operating at high frequencies.



2. The establishment of a high accuracy electrocast metal mold manufacturing technique and a high endurance release metal mold coating technique

In reference to the manufacturing technique used for electrocast metal molds, a derivative of triazine thiol has been introduced into the adhesive process used for bonding electrocast molds (nickel type) with a composite body (comprised of metallic powder and epoxy resin) that form the back-up ingredients for the mold. Triazine thiol has also proven effective in manufacture of the composite body. In comparison with former processes, use of the triazine thiol derivative has paved the way for a fast, cost-effective and highly accurate electrocast mold manufacturing technique. Furthermore, by coating the release mold in triazine thiol containing fluorine during epoxy resin molding processes, it has been possible to realize functional high endurance mold release that requires less release agent.

Through the establishment of a uniform release mold technique for uneven, complex surfaces, the production of metal molds for making Fresnel lenses and other intricate nano shapes, as well as LSI circuit encapsulation, has been successfully undertaken.



Electrocast metal mold
(concept model)

About the approach after the project

1. Promotion of the development of new manufacturing techniques for next generation printed circuit boards

Further development of research into the adhesiveness of smooth surfaces such as copper foil and epoxy resin, as demonstrated through this research program, as well as the publication of notable scientific results is intended. Using the high-functionality of triazine thiol, development of a metal plating technique that exhibits good adhesion with various materials (plastics, ceramics, glass) is planned, as is the realization of high performance nano printed circuit board manufacturing techniques and three-dimensional circuit molding techniques for mobile telephones. The future will see the further expansion of this research, with the development of built-in organic element 'system-in packages' and scheduled adaptation in line with the transition to electronic manufacture in the car manufacturing industry. Adopted by the Regional Research and Development Resource Use Program (2006-2008).

2. Promotion of new developments relating to metallic molds

Intermittent research and development has been promoted in Iwate through the Government, Industry and Academia Cooperative Research and Development Project (2006-2008), an undertaking unique to the prefecture, which aims at the commercialization of the high accuracy electrocast metal mold manufacturing technique and high endurance release metal mold coating technique. The high accuracy electro-cast metal mold manufacturing technique will of course be used in the production of car bumpers and other large components, but will also be applied to the manufacture of optical lenses and LED. Furthermore, in reference to the high endurance release metal mold coating technique, promotion of research and development that aims to be adaptable to the metal mold industry's expected market demand for electro-cast molds (nickel plated) is scheduled.