

Semiconductor Packaging Materials Manufactured by Nippon Steel Chemical Co., Ltd.

Nippon Steel Chemical's commitment to semiconductor packaging technology is represented by the two goals: full exploitation of material potential as expressed in the company's CI "Exploring the future through raw material engineering" and proposition of solutions with "agility" as expressed in "Collaboration by means of open laboratory".

For Nippon Steel Chemical, raw material potential refers to development of functional resin materials, which starts with designing of primary structure, such as the company's original photosensitive resin, polyimide resin, and epoxy resin, by using such polycyclic aromatic compounds induced from coal chemistry, which is one of the basic operations of the company.

Proposition of solutions with "agility" means that we work together with customers that want new semiconductor packaging to develop packaging technologies at Open Laboratory (a laboratory NSC opened for the study of packaging technologies; see the photo below), thus offering our customers the best solutions. For example, COE² (Chip-on Espanex with Esarex) of COF package for LCD driver IC is the flipchip package solution for the state-of-the-art 30 μm pitch using our non-adhesive copper-clad laminate for FPC substrate (Espanex), which features high dimensional stability and heat resistance, and our original NCP (Esarex), which has a short bonding time. Other ideal solutions we provide include paste and film materials for new processes such as connectorless bonding of substrate and hollow resin sealing.



Nippon Steel Chemical's semiconductor packaging products lineup and their main features are listed below.

< For build-up substrates for BGA >

Insulation film for internal layer laser build-up

Excellent copper plating adhesiveness
- Non-filler/high flatness (after desmearing process), high elongation after fracture (25%), and low elasticity

Photosensitive insulation film for outermost layer and SR

High resolution (Aspect ration: Via = 1, L/S = 2)
Via size of 30 μm in diameter (30 μm in thickness) can be produced.
Dielectric constant: of 2.8 (1 GHz), elongation after fracture of 15%

< For CSP die-attach >

Die-attach film

Lowered stress due to low CTE (20 ppm)
High solder heat resistance in Pb-free soldering
Low-temperature laminates at 100°C or lower are available.

< For WLP rewired layer and passivation layer >

Photosensitive insulation varnish

High resolution (Aspect ratio: Via = 1, L/S = 2)
Via size of 30 μm in diameter (30 μm in thickness) can be produced.

High thermal resistance Tg = 250°C (DMA)

< For TCP substrate and bonding material >

NCP and ACP for batch pressure welding or pressure bonding

Quick hardening characteristics such as 2-second bonding specification (after-hardening is not necessary.)

Voidless finish due to excellent fluidity

High reliability due to high purity and high bonding performance

Underfil for capillary flow

Extra-low viscosity and extra-high purity epoxy resin is used.

High reliability due to non-acid anhydrous hardening system

< Others >

Hollow sealing sheet

Highly airtight due to excellent shape-tracking characteristics

Thick-film products can be manufactured, too.

Paste for connectorless bonding

Bonding at a 100-um pitch is possible.

High bonding strength in glass/FR-4 and FPC/FR-4 bonding

There is a need for increasingly sophisticated state-of-the-art packaging and mounting. Collaboration between manufacturers and customers regarding the process development stages is indispensable for the development of materials that meet customers' needs. Nippon

Steel Chemical is going to contribute further to the development of a high-density information-intensive society with "Open Laboratory" serving as a bridge between the company and customers.

(For more information, contact us below.)

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