

HOJEONABLE

Harmonious 기존 부품과 공정에 조화롭게

Joinable 합쳐질 수 있는

Applicable 적용성이 우수한 소재를 제시합니다.



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"본 홍보물은 중소기업청 창업사업화지원사업인 중진공 청년창업사관학교의 정부지원금에 의해 제작된 것 입니다"



HOJEONABLE



An introduction to company

Hojeonable (HJA), a spin-off company of Electronics and Telecommunications Research Institute (ETRI), was founded in Jan. 2012 in order to commercialize the research results and play a pivotal role in the electrode material field of electronic packaging industry.

Despite domestic packaging companies are in front in the manufacturing technologies and producing high-quality packages, a high-value packaging materials have been still supplied by oversea material companies. This situation has consistently delayed the application and follow-up of new materials, and the mass-production of preceding packages and modules, resulting in weakening in industrial competitiveness. Hence, localization development of state-of-the-art packaging materials is in urgent need.

HJA has been developing the mass production of multi-functional electrode materials such as epoxy solder paste or epoxy copper paste, special-functional packaging materials such as epoxy flux paste of thermally conductive paste, and filler materials such as Cu of Ag-coated Cu powder for last 3 years. These materials have more excellent processability, functionality, and price competitiveness than any other materials.

HJA will never stop innovating in the research and development. With customers, moreover, HJA will endeavor to solve the difficulties that customers face. Resultingly, HJA will play a role as a leading global company in the field of electronic packaging materials.

(주)호전에는 한국전자통신연구원(ETRI)에서 개발한 우수 연구결과를 기술 출자한 ETRI 연구소 기업으로 국내 패키지 산업 분야에 일익을 담당하고자 2012년 1월에 창업한 지식 기반의 벤처회사입니다.

세계 패키지 기술과 제품을 국내 기업이 선도하는 상황에서도 패키지 전극 소재는 오랜 연구 경험과 풍부한 제품 적용 결과를 보유한 해외 전문 소재업체 공급에 의존하고 있습니다.

패키지 소재 전문지식과 다양한 패키지 개발 경험을 보유한 저희 회사는 해외업체에서 공급하는 전극 소재보다 성능이 우수한 다기능 전극 소재를 개발하였고, 현재 주요 고객사로부터 긍정적인 평가 결과를 얻었습니다.

향후, 저희 회사는 전극소재 관련 전문지식을 기반으로 지속적인 R&D 연구를 통하여 고객 여러분의 다양한 요구 사항과 어려움을 가장 먼저 충족시키고 해결할 수 있는 전문 소재 기업으로 성장하겠습니다.

(주)호전에는 임직원 일동

History

- 2012. 01 Hojeonable Inc. was founded
(주)호전에는 창업
- 02 R&D center was established
(주)호전에는 부설연구소 설립(한국산업기술진흥협회장)
- 05 Approved for the 30th research company by Ministry of Science, ICT and Future Planning
연구소기업 30호 설립승인(미래창조과학부장관)
- 08 Enrolled as a venture company
벤처 기업 등록(기술보증기금)
- 12 Pilot line process was built
소재 Pilot Line 생산 시설 구축
- 2013. 06 Development of Sn-Bi epoxy solder paste
저온용 ESP 소재 개발 완료
- 09 Application of Sn-Bi epoxy solder paste for flexible LED modules
저온용 ESP 소재 Flexible LED 제품 적용
- 2014. 04 Development of SAC ESP
고온용 ESP 소재 개발완료
Moving to a new company building
신사옥 이전(대전광역시 유성구 테크노11로 17)
- 06 Facility construction for mass production
소재 대량 생산 시설 구축
- 07 Enrolled as a material-producing factory
소재 생산 공장 등록(연구개발특구진흥재단)

“
World-class Top-quality Epoxy Solder Paste for the
SMT Process that can Reduce Energy and CO2 Emission.
Leading the Package Bonding Materials and
Growing R&D Driving Company !
”

세계 최고 Epoxy Solder Paste 소재의 양산판매를 통한
전문 소재기업으로의 성장!

01

제품개발기

Period of Product Development

2012~2014

Application for Flexible LED Display Modules
플렉시블 display 제품 적용

02

시장진입기

Period of Entering to Market

2015~2017

Application for Consumer & Automotive Modules
소재 대량 생산 공급

03

도약기

Period of Company Growth

2018~2020

Export of ESP Material
소재 해외(중국) 수출

Epoxy Flux Paste (without filler)

Characteristics

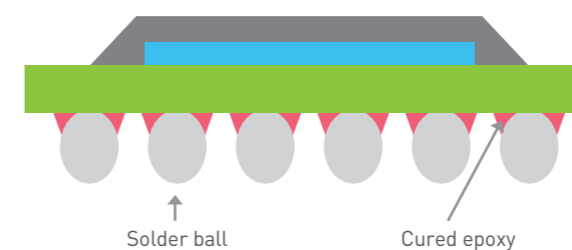
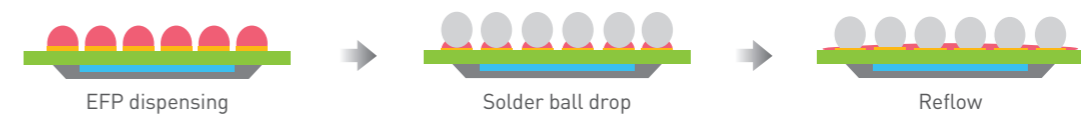
- Fluxing effect the metal oxide film on package lead, solder ball, and Cu pad
- Solvent-free, cleaning-free, corrosion-free
- Customized formulation (viscosity, curing temp. curing time, T_g , etc)

Application Field

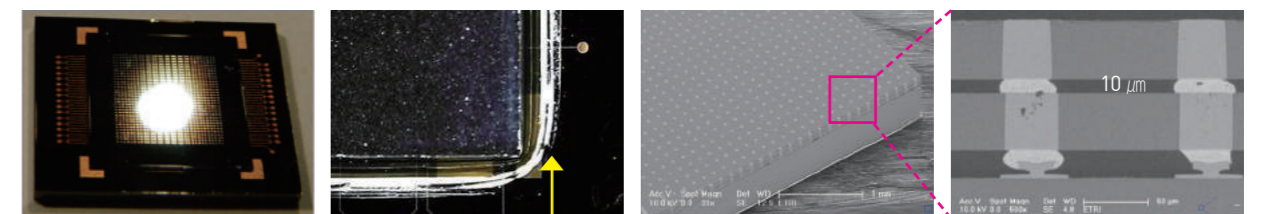
- Reinforcement of bump edge by fillet formation after mounting of solder balls
- Stack chip package
- Package on package (PoP)

Application Example

- Solder ball mounting process



- Chip stacking



Fillet Forming

Epoxy Flux Paste (with filler)

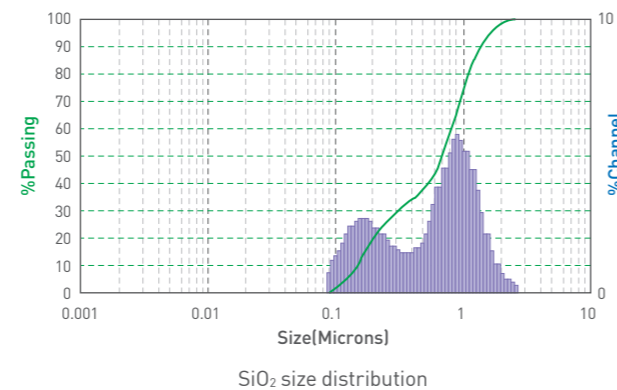
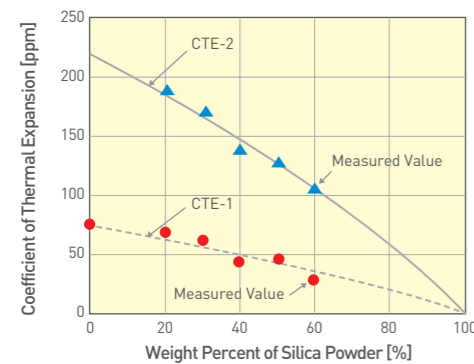
Characteristics

- No-flow underfill material
- SiO₂ filler content: 10-70 wt%
- SiO₂ filler size: 0.2-4 μm
- Customized formulation (viscosity, curing temp, curing time, T_g, etc)

Application Field

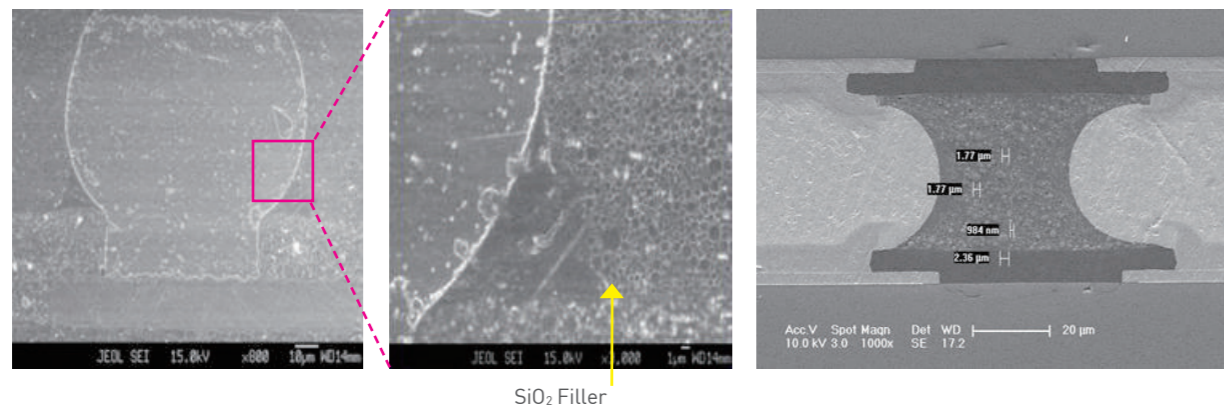
- Mounting of driver IC chips on film flip chips package
- Mounting of application processors on flip chip package
- Fine pitch I/O flip chip package

CTE Vs SiO₂ content



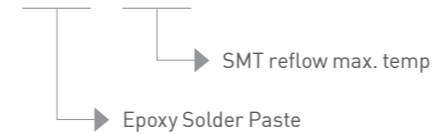
Application Example

Flip chip package

SiO₂ Filler

HJ-ESP series

ESP - 000 Series



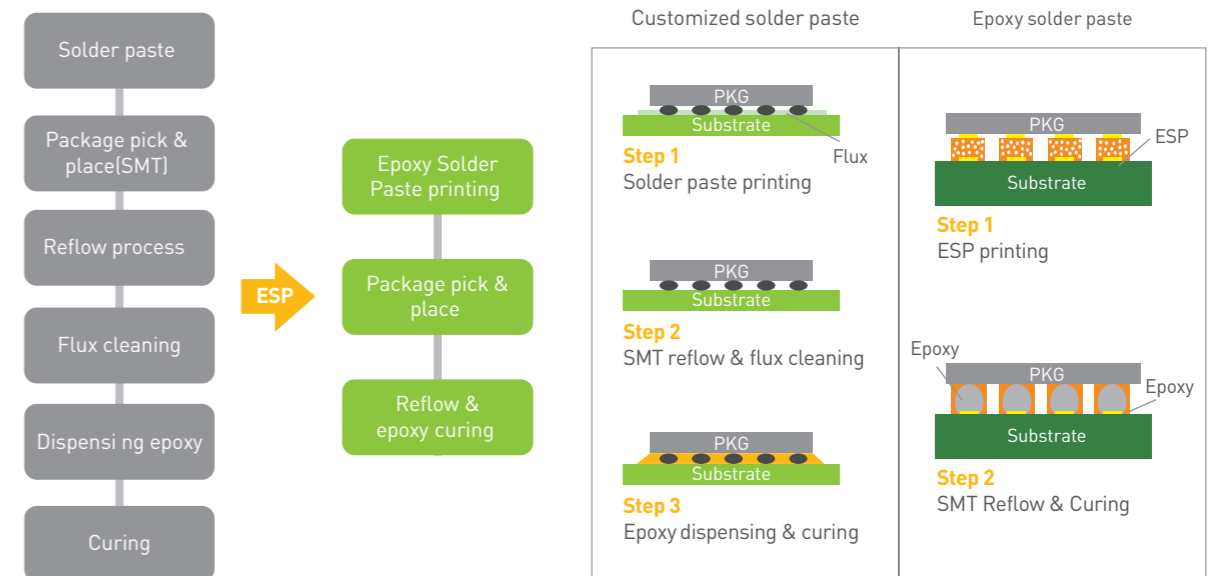
ESP-000 Characteristics

- Epoxy-base solder paste
- Five-free (solvent-free, void-free, cleaning-free, corrosion-free, electrical short-free)
- Customized formulation (viscosity, curing temp, curing time, T_g, etc)
- Excellent bonding strength and electric insulation property

Products	ESP-130	ESP-150	ESP-180	ESP-240
Solder powder composition (wt%)	Sn-27In-54Bi	Sn-58Bi, Sn-57.6Bi-0.4Ag	Sn-58Bi, Sn-57.6Bi-0.4Ag	Sn-3.0Ag-0.5Cu
Application	Plastic substrate	PET film	PI film Rigid PCB	Rigid PCB

ESP-000 Product Effect

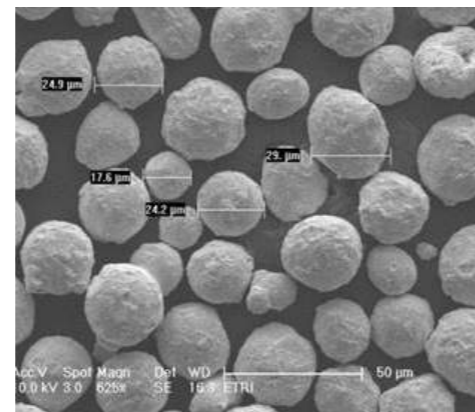
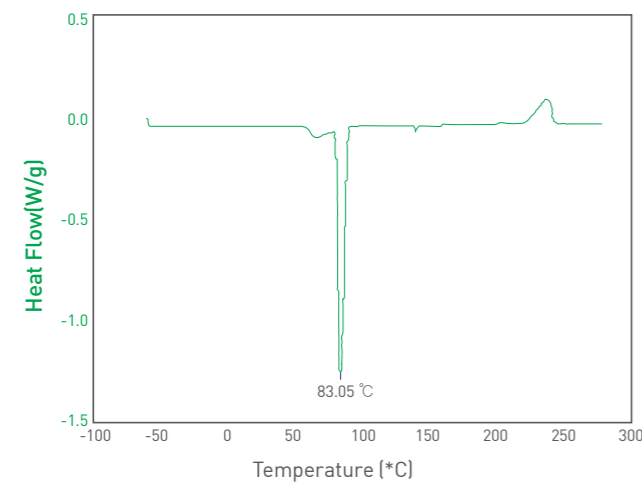
- compared to the conventional process



Epoxy Solder Paste (HJ-ESP-130)

Characteristics

- Reflow peak temp: 130 °C
- Metal powder composition: Sn-27 In-54Bi solder
- Improved solder joint strength
- Customized formulation (viscosity, curing temp, curing time, T_g , etc)

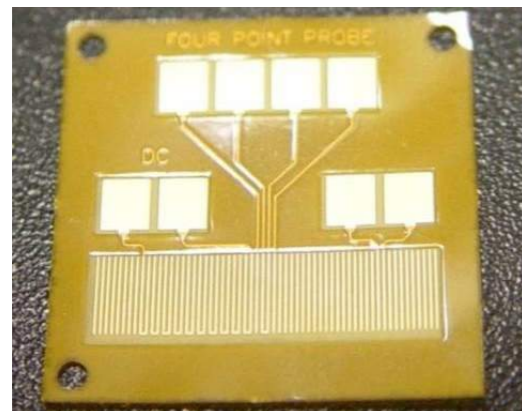


Sn/27 In/54 Bi

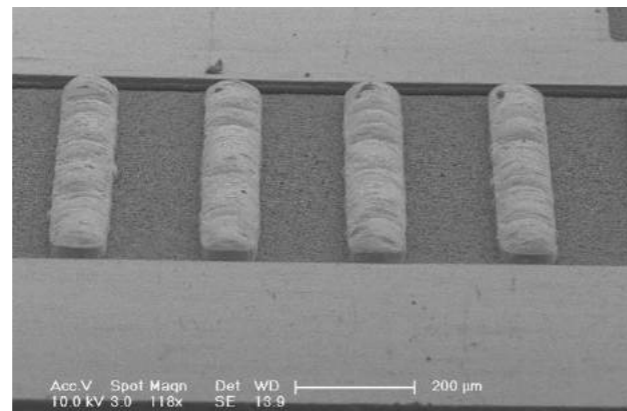
Application Field

- SMT on plastic substrates
- SMT on textile substrates
- SMT on flexible PET

Application Example



FPCB
Pitch: 200 μm
Line width: 60 μm

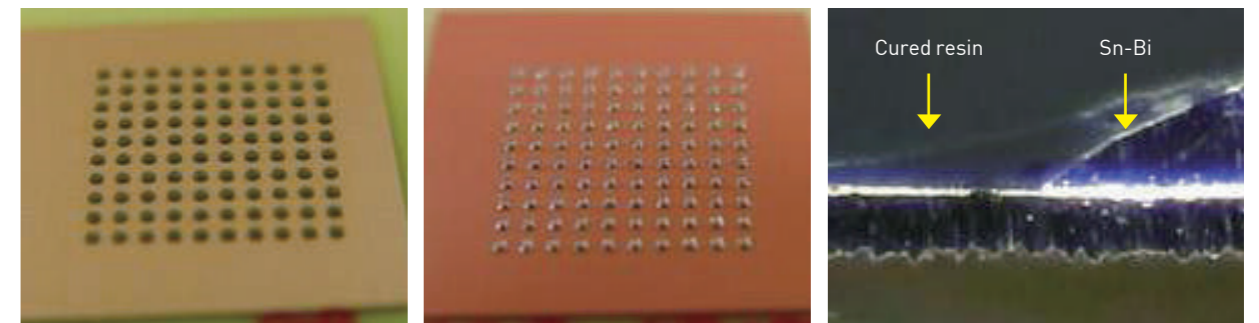


After Reflow

Epoxy Solder Paste (HJ-ESP-150)

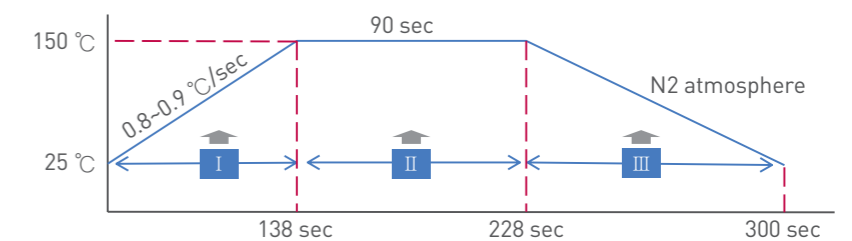
Characteristics

- Reflow peak temp: 150 °C
- Metal powder composition: Sn-58Bi, Sn-57.6Bi-0.4Ag
- Post curing: 120 °C, 30 min



Application Field

- SMT on rigid PCBs
- SMT on textile substrates
- SMT on flexible PET films



I. Ramp up (R.T ~150 °C)	II. Hold Time(150 °C)	Peak temp.	III. Cooling(150 °C ~ 25 °C)
Above 0.8~0.9/sec.	90 sec.	150 °C	-1~-2 °C/sec.

Application Example



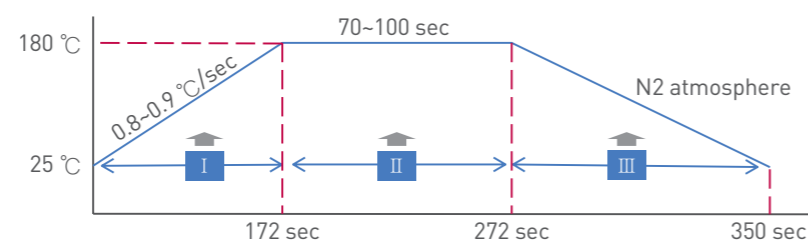
Epoxy Solder Paste (HJ-ESP-180)

Characteristics

- Reflow peak temp: 180 °C
- Metal powder composition: Sn-58Bi, Sn-57.6Bi-0.4Ag
- Shear strength: 1.5 times higher than that of conventional SAC solder paste
- Low energy consumption process
- Solvent-free, void-free

Application Field

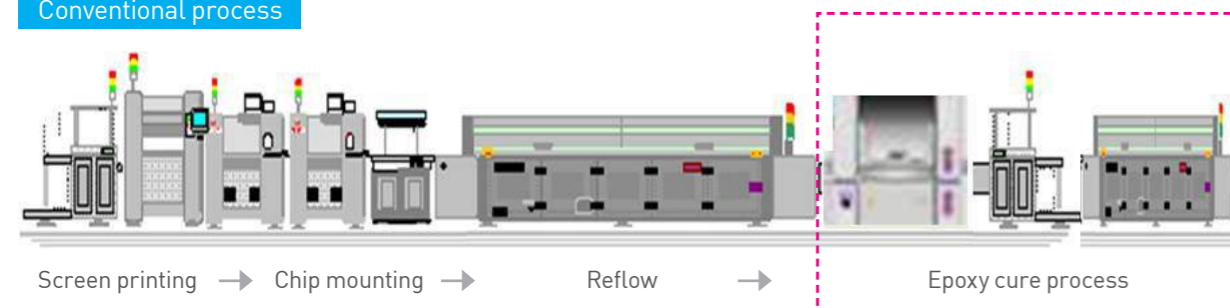
- SMT on rigid PCBs
- SMT on PI Films
- Smart Phone and flexible modules



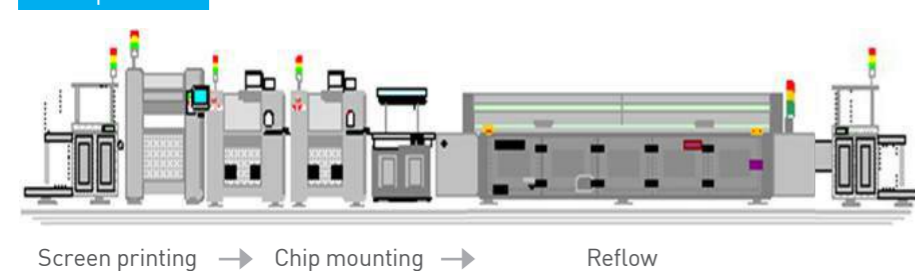
I. Ramp up(R.T~180 °C)	II. Hold (180 °C)	Peak temp.	III. Cooling(180 °C~)
0.8~0.9 °C/sec.	70~100 sec.	170~190 °C	-1~-2 °C/sec.

Application Example

Conventional process



New process



Epoxy Solder Paste (HJ-ESP-240)

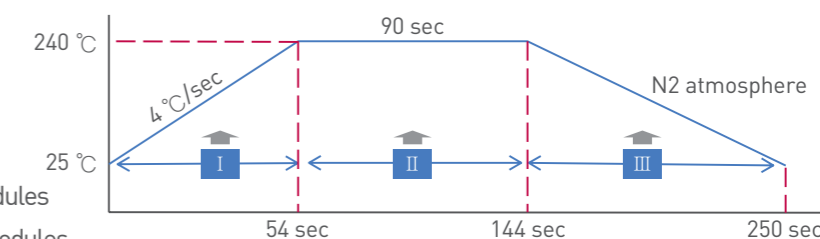
Characteristics

- Reflow peak temp: 240 °C
- Metal powder composition: Sn-3.0 Ag-0.5 Cu solder
- Shear strength: 2 times higher than that of conventional SAC solder paste
- High bonding strength and reliability



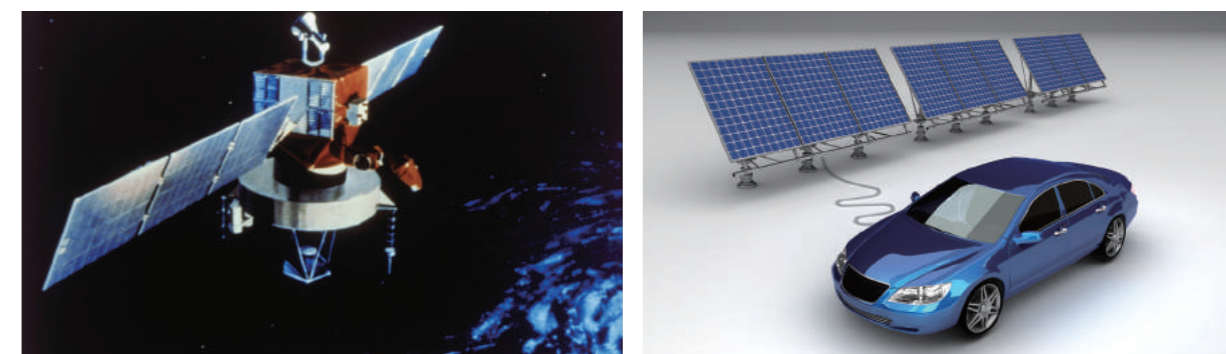
Application Field

- SMT on PI substrates
- SMT on rigid PCB substrates
- SMT for automotive electronic modules
- SMT for military and aero space modules



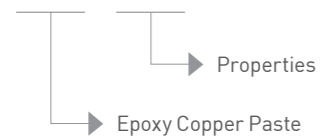
I. Ramp up(R.T~240 °C)	II. Hold Time(240 °C)	Peak temp.	III. Cooling(240 °C~25 °C)
Above 4 °C/sec.	90 sec.	235~245 °C	-1~-2 °C/sec.

Application Example



HJ-ECP series

○ ECP - 000 Series



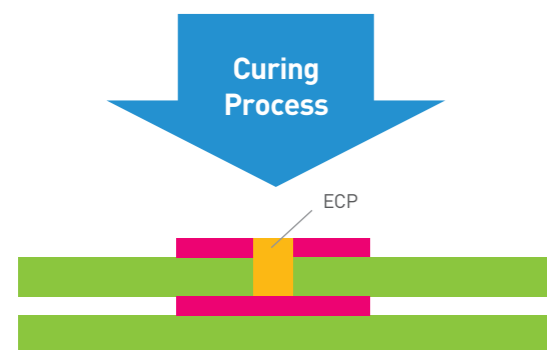
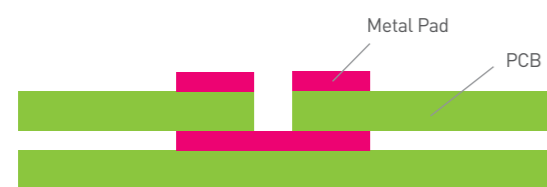
○ ECP-000 Characteristics

- Epoxy-base copper paste
- Five-free (solvent-free, void-free, cleaning-free, corrosion-free, electrical short-free)
- Customized formulation (viscosity, curing temp. curing time, T_g , etc)
- Filler metal type: nano Cu powder, nano Ag-coated Cu powder

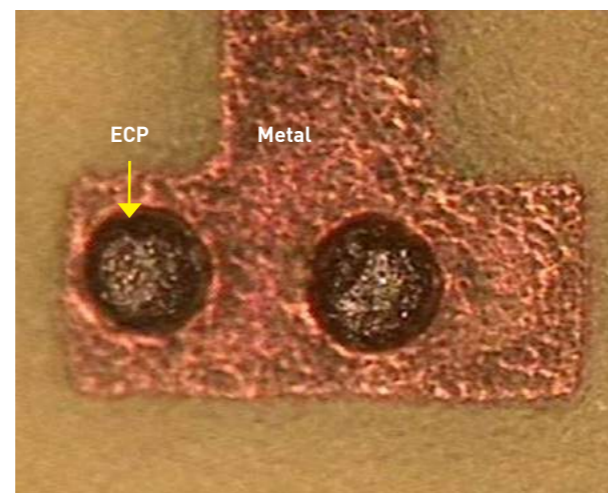
Products	ECP-NCP	ECP-ACC-Paste	ECP-HB-180	ECP-HB-240	ECP-ACNC
Metal composition	Nano Cu powder	Ag-coated Cu powder	Cu powder+[Sn-Bi solder powder]	Cu powder+[Sn-Ag-Cu solder powder]	Ag-coated nano Cu powder
Application	PCB via filling	PCB via filling, Die attach	Die attach	Die attach	Die attach

○ ECP-000 Product Effect

- Replacing conventional Ag paste for via filling or die attach



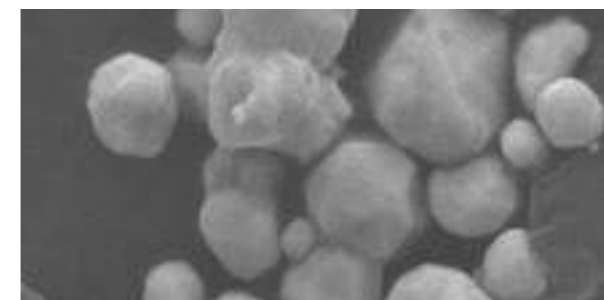
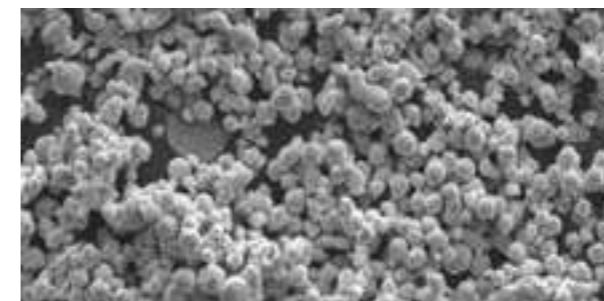
Diameter of Hole : 0.1 ~ 0.3mm



Epoxy Cu Paste (HJ-ECP-NCP)

○ Characteristics

- Cu particle size: 300-1500 nm
- Electrical conductivity: $1 \times 10^{-4} \Omega \cdot \text{cm}$
- Filler content: 70-80 wt%



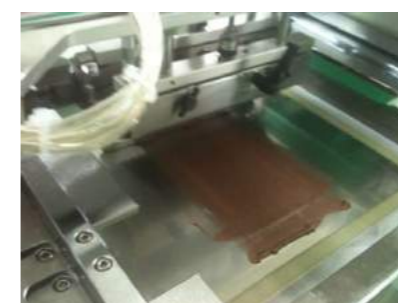
SEM image

ECP-NCP Product

○ Application Field

- Formation of conductive electrode and line
- PCB via filling

○ Application Example



ECP-NCP Printing



PCB Substrate

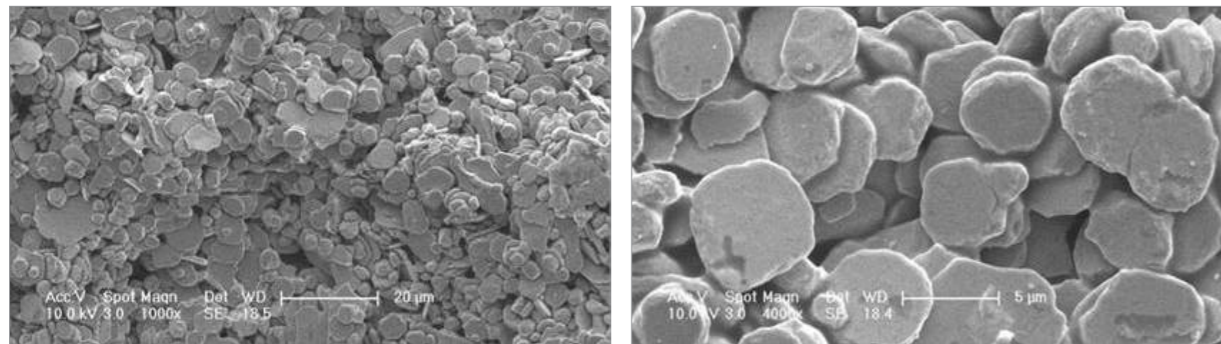


After Curing

Ag-coated Cu paste (HJ-ECP-ACCP)

Characteristics

- Ag content: 5-20 wt% in the powder
- Filler content: 70-80 wt%
- Proper electrical conductivity: 10^{-3} - 10^{-4} $\Omega \cdot \text{cm}$
- Low cost in comparison with the conventional Ag paste



Type

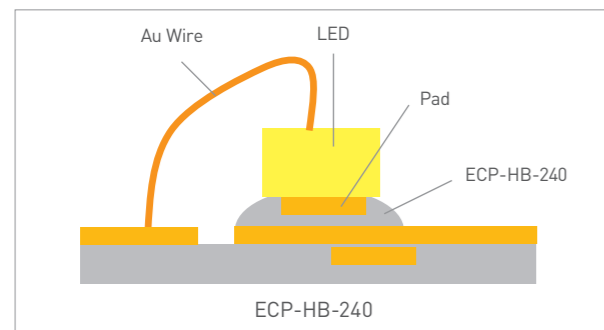
- ECP-HB-180: Low-temperature (~180 °C) curable conductive paste
- ECP-HB-240: High-temperature (~240 °C) curable conductive paste

Application Field

- Formation of conducting electrode and line
- PCB via filling, die attach
- Dispensing or printing

Application Example

- Die attach paste



LED Power: 1.2W / Applied Current: 400mA

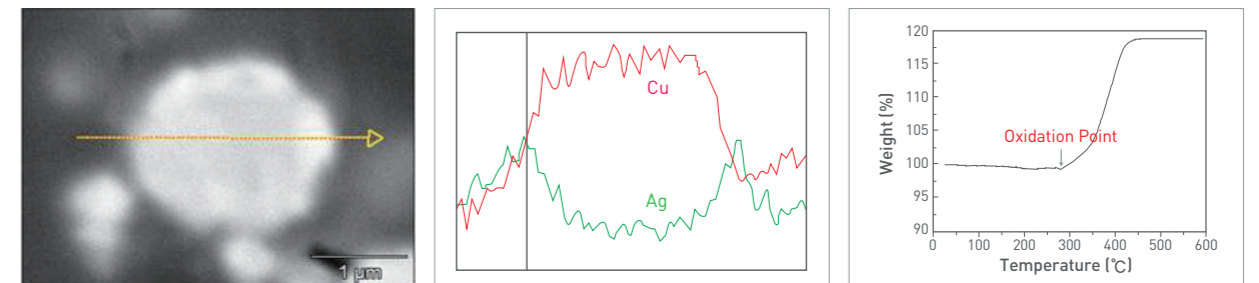


Measured Voltage: 3.32V

Sub-micron Ag coated Cu powder (HJ-SACC-Powder)

Characteristics

- Particle size: 300-1500 nm
- Ag content: 5-20 wt%
- Low material cost in comparison with the pure Ag filler



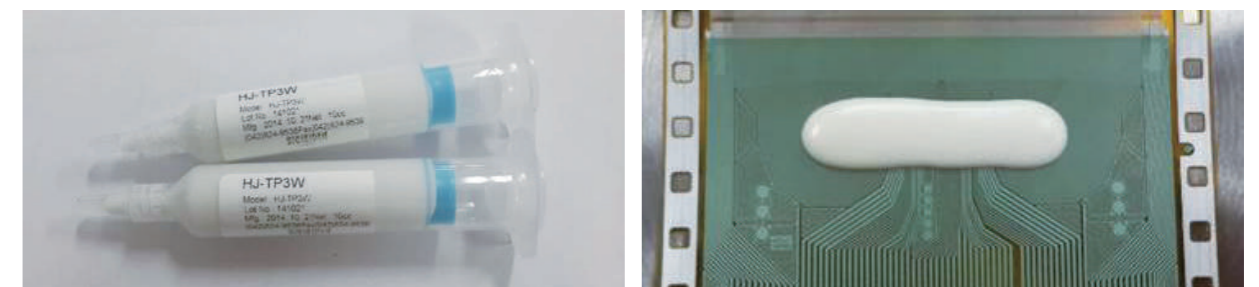
Application Field

- Replace nano Ag powder
- Nano Ag coated Cu paste filler

Thermally Conductive Paste (HJ-TP-3W)

Characteristics

- High thermal conductivity: 3 W/mK
- Al_2O_3 content: 80 wt%
- Thixotropic index: 0.5
- Viscosity at 25 °C: 14000 cps
- Coefficient of thermal expansion (CTE): less than 20 ppm
- Peel strength: 1.4 (± 0.2) kg_f/cm



Application Field

- Thermal interface material (TIM)