AMPLE Electronic Technology Co., LTD
2021
Investor Conference

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ELECTRONIC TECHNOLOGY

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- This presentation contains certain forward-looking statements that are based on current expectations and are subject to known and unknown risks and uncertainties that could cause actual results to differ materially from those expressed or implied by such statements.

- Except as required by law, we undertake no obligation to update any forward-looking statements, whether as a result of new information, future events or herwise.

Outline

- Company Overview
- Market Outlook
- Financial Review & Guidance
- Core Technology & Advanced Technology Development
- Q&A

Outline

- Company Overview

Introduction

- Established: **June 8, 2007**
- Capital: **NTD 308,154,200**
- Main Products：**Conductive Paste**
  (Cu paste & Ag paste)
- Location：
  No.32, Dayou 3rd St., Daliao Dist, Kaohsiung City, Taiwan

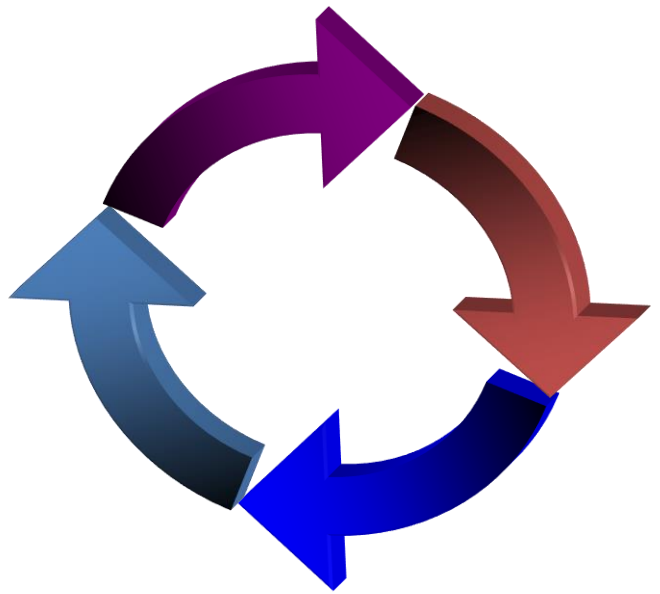
Outline

- Market Outlook

Industry Overview

The star industry in 2021 will focus on semiconductors and automotive themes

Looking forward to 2021, star industries such as semiconductors, electric vehicles, price increases, 5G, and long-distance demand, which will drive foundry, IC design, Wi-Fi 6, silicon wafers, equipment materials, and automotive electronics , DRAM, passive components, 5G equipment and raw materials and other sub-industry needs.



Growth Momentum

2022

- EMI Shielding
- Graphene Thermal Conductor

2021

- Lithography Ag paste
- LED package paste

2020

- Ag paste for Resistor
- Rear Ag paste for Solar Cell

Outline

- Financial Review & Guidance

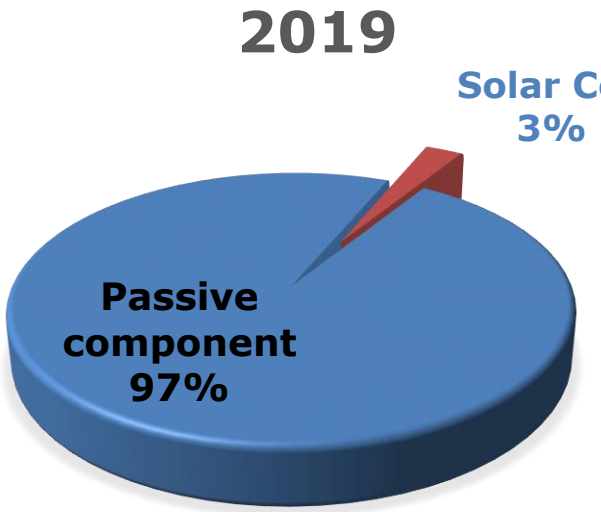
Business Performance in 2000

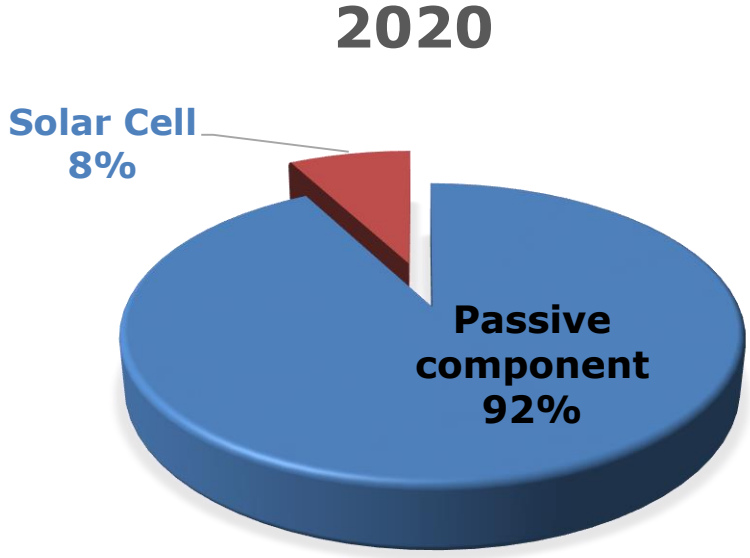
Penetrate into Korea Market

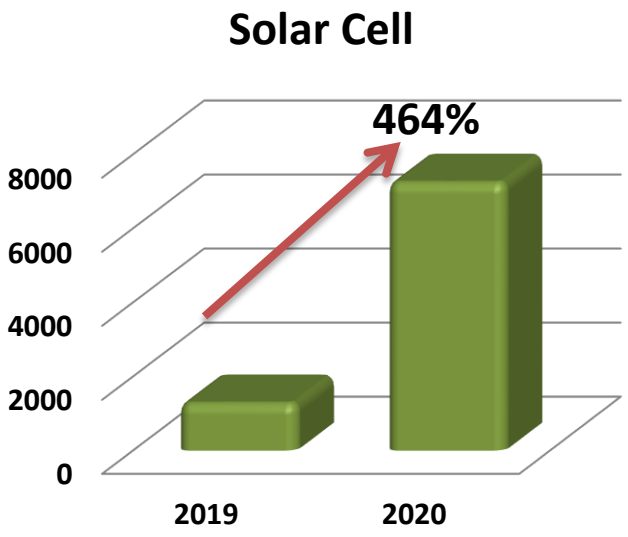
Hit the record high of Revenue

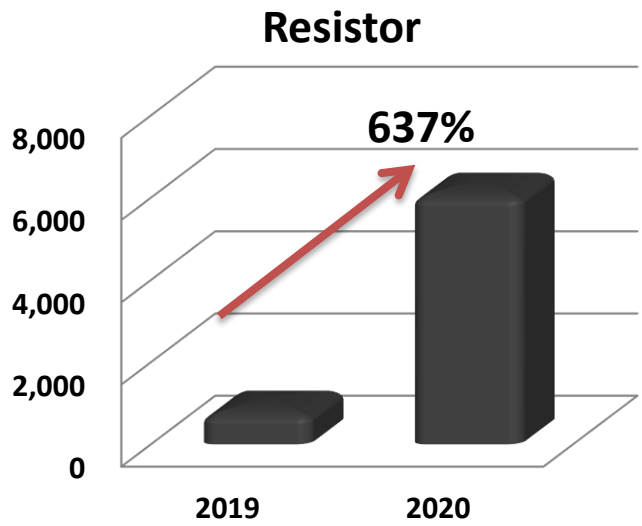
Shipments of Ag paste (Resistors, Solar Cell) increase by 5 times

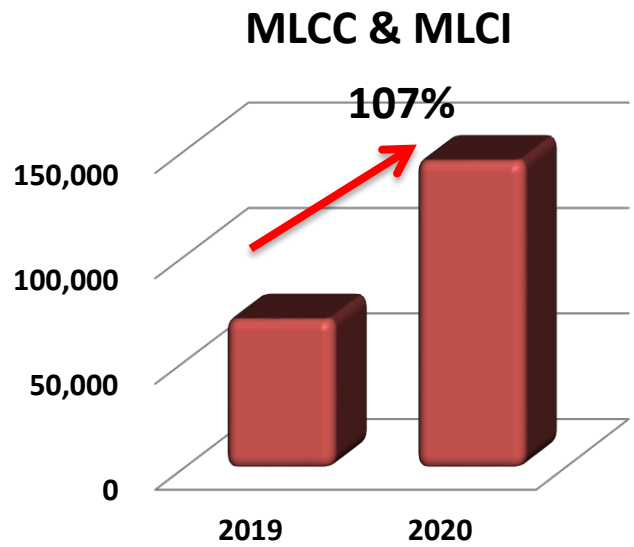
Product Mix


2019
Solar Cell
3%
Passive
component
97%


2020
Solar Cell
8%
Passive
component
92%

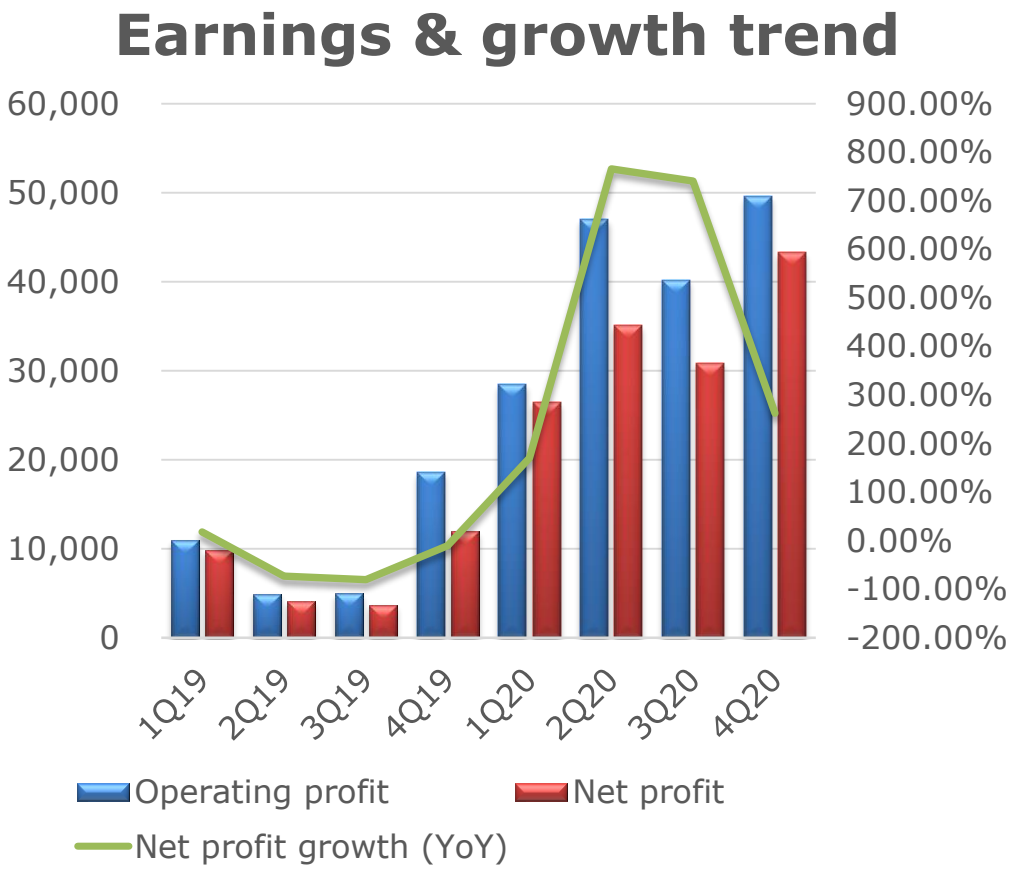

Solar Cell
464%
8000
6000
4000
2000
0
2019
2020

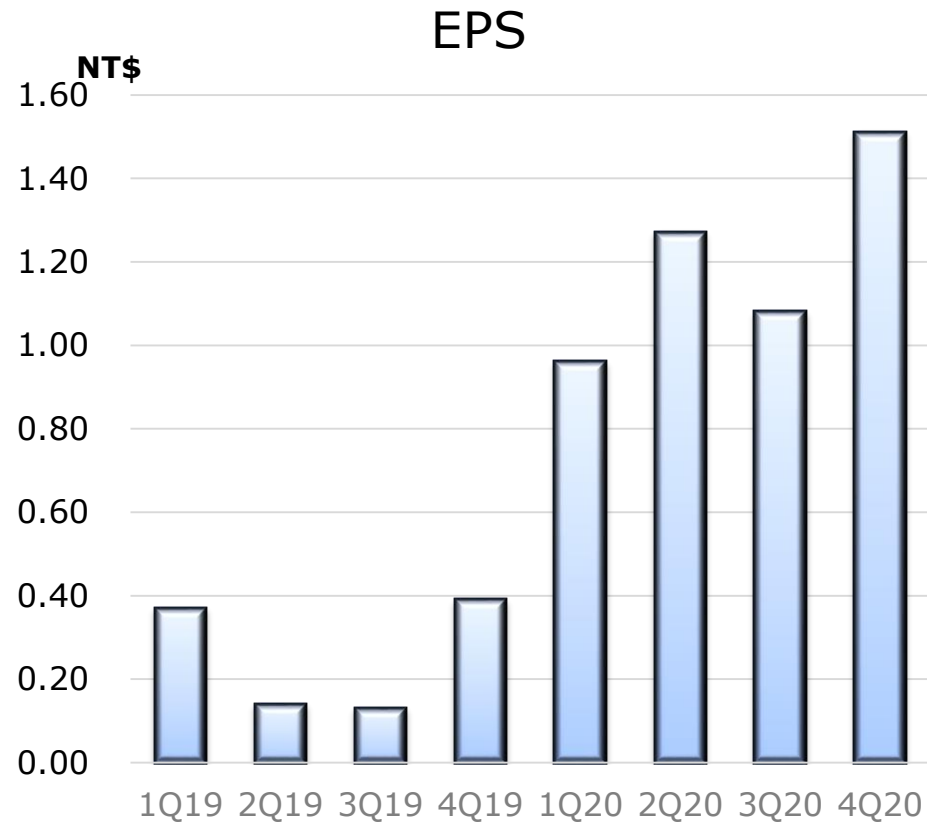

Resistor
637%
8,000
6,000
4,000
2,000
0
2019
2020


MLCC & MLCI
107%
150,000
100,000
50,000
0
2019
2020

Earnings Trend

- **Net profie, 4Q20=NT$43,292k, QoQ 40%, YoY 262%**
- **EPS 4Q20=1.51, 3Q20=1.08**





Statements of Comprehensive Income

(Unit: NT Thousand)	2020Y	2019Y	YoY	2018Y
Net revenue	1,213,542	589,199	106%	713,249
Gross profit	255,887	123,650	107%	166,951
Gross margin(%)	**21.09%**	**20.99%**		**23.41%**
Operating expenses	(90,721)	(84,351)	8%	(99,061)
Operating expenses rate(%)	**-7.48%**	**-14.32%**		**-13.89%**
Operating income	165,166	39,299	320%	67,890
Operating margin(%)	**13.61%**	**6.67%**		**9.52%**
Non-operating incomes and expenses	2,025	(2,269)		2,828
Income before income tax	167,191	37,030	352%	70,718
Income tax expense	(31,621)	(7,603)		(14,678)
Net income	135,570	29,427	361%	56,040
Net margin(%)	**11.17%**	**4.99%**		**7.86%**
EPS(NT$)	**4.74**	**1.03**	**360%**	**2.20**
Other comprehensive income , net	15	(4,400)		83
Comprehensive income	135,585	25,027	442%	56,123
ROE(%)	22.60%	6.30%		12.94%
Depreciation	19,184	17,985		14,591
CAPEX	11,878	7,765		51,980

Balance Sheets

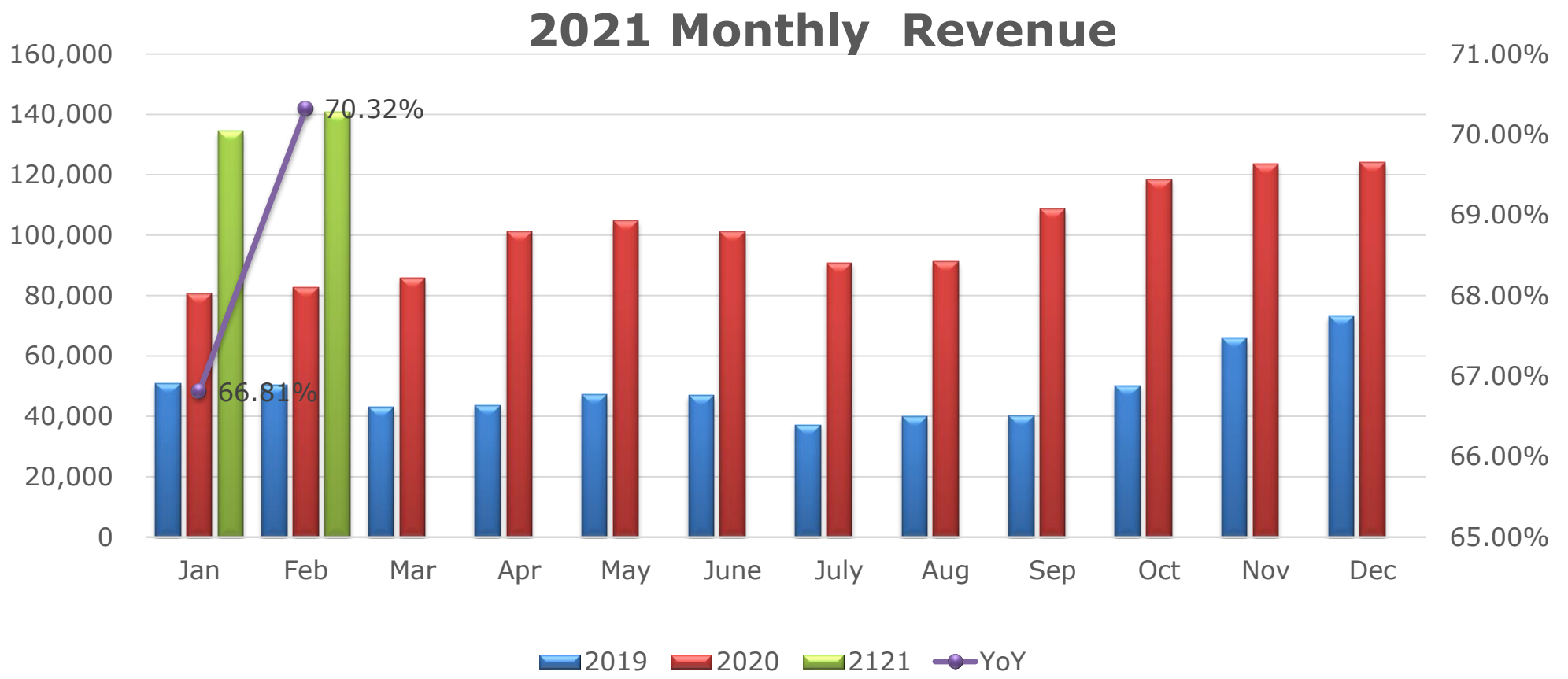
(Unit: NT Thousand)	2020/12/31		2019/12/31	
	$	%	$	%
Cash and cash equivalents	84,870	8%	87,164	11%
Accounts receivable, net	483,680	43%	227,081	29%
Inventories	245,619	22%	195,433	25%
Other current assets	58,890	5%	28,283	4%
Total current assets	873,059	78%	537,961	69%
Property, plant and equipment	215,026	19%	217,504	27%
Other non-current assets	39,065	3%	33,097	4%
Total non-current assets	254,091	22%	250,601	31%
Total assets	**1,127,150**	**100%**	**788,562**	**100%**
Current liabilities	400,019	36%	295,162	38%
Non-Current liabilities	127,174	11%	26,189	3%
Total liabilities	**527,193**	**47%**	**321,351**	**41%**
Capital stock	308,154	27%	295,000	37%
Other equity interest	291,803	26%	172,211	22%
Total equity	599,957	53%	467,211	59%
Book value per share(NT$)	19.47		15.84	
Key Indices				
Current ratio	218%		182%	
Debt ratio	47%		41%	

Non-operating income and expenses

(Unit: NT Thousand)	2020Y	2019Y
Foreign exchange gains	755	476
Net gains on disposal of financial assets / liabilities at fair value through profit or loss	5,930	(1,113)
Gains on call options / put options of Convertible bonds payable ,net	487	-
Gains on disposal of property, plant and equipment, net	-	991
Others	(5,147)	(2,623)
總計	**2,025**	**(2,269)**

2020～2021 Monthly Revenue YoY

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Accumulated
2019	51,004	50,479	43,168	43,637	47,232	46,889	37,171	40,068	40,337	50,044	65,917	73,253	589,199
2020	80,640	82,699	85,892	101,307	104,752	101,221	90,835	91,257	108,755	118,460	123,589	124,137	1,213,542
2121	134,517	140,857											275,374
YoY	66.81%	70.32%											



2021 Guidance

- Revenue of 1Q21 is expected to increase by more than 10% QoQ.
- The gross margin of 1Q21 is expected to be flat.

Dividend Policy

Year	2017	2018	2019	2020
EPS (NT$)	1.56	2.20	1.03	4.74
Dividends (NT$)	0.90	1.40	1.20	3.20
Dividend Payout Ratio(%)	57.69%	63.64%	116.50%	67.51%

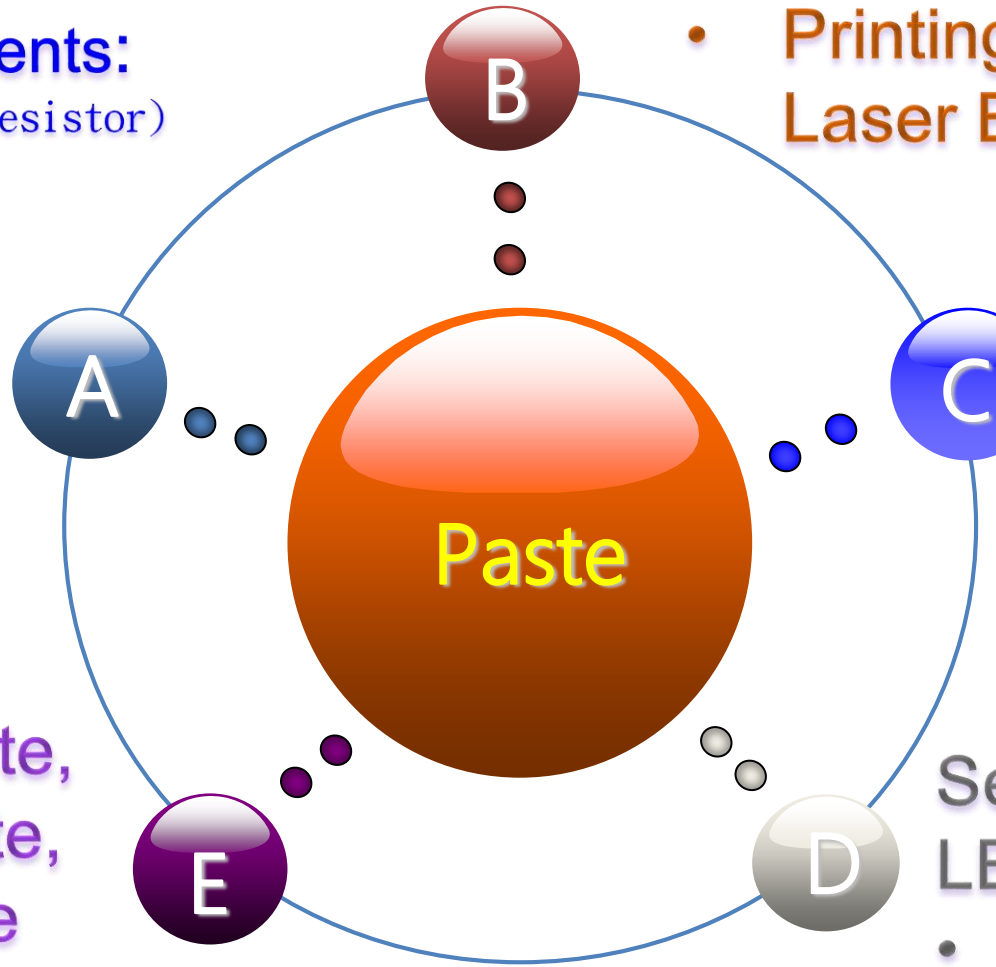
Outline

- Core Technology &
  Advanced Technology Development

Applications of Conductive paste

Passive Components:
(Capacitor, Incuctor, Resistor)
- Ag paste
  Pd/Ag paste
  Cu paste
  Ni paste

Touch Panel:
- Printing type
  Laser Etching type



Membrane Switch:
- Ag paste

Solar Cell:
- Front Ag paste,
  Rear Ag paste,
  Rear Al paste

Semiconductor, LED Package:
- Ag paste

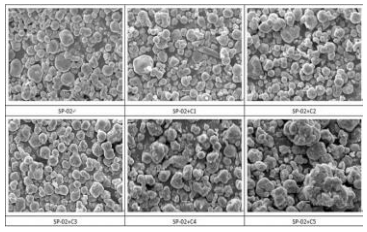
The technical trend and core of printable internal electrodes for multi-layer ceramic chip

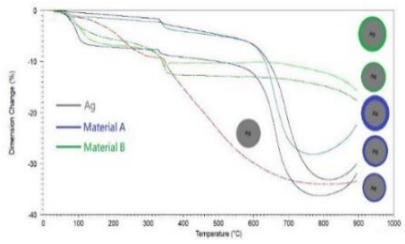
◆ Industrial trend: Performance requirements of terminals-Light、Thinner、Short、smaller

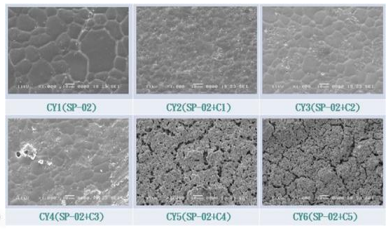
Chip size(mm)	~4532	0402	0201	01005
Line widths in printing	>150um	40~60um	30~40um	<30um
Manufacturing process	Screen printing			Photolithography

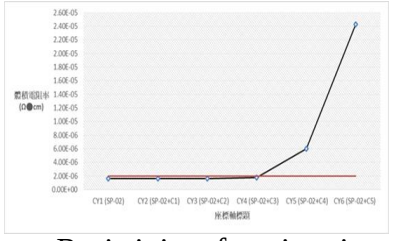
- The current trend of design requirements for thinner and smaller device, so the chip size is developing towards thinner. From the initial size of 4532 to 0402 small size, and even 0201 smaller size.

◆ Technical achievements

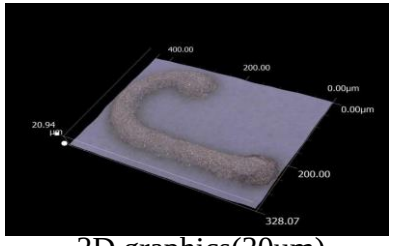




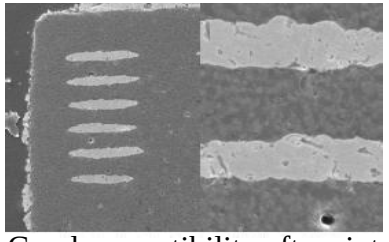




Resistivity after sintering



3D graphics(30um)



Good compatibility after sintering

◆ Core Technique

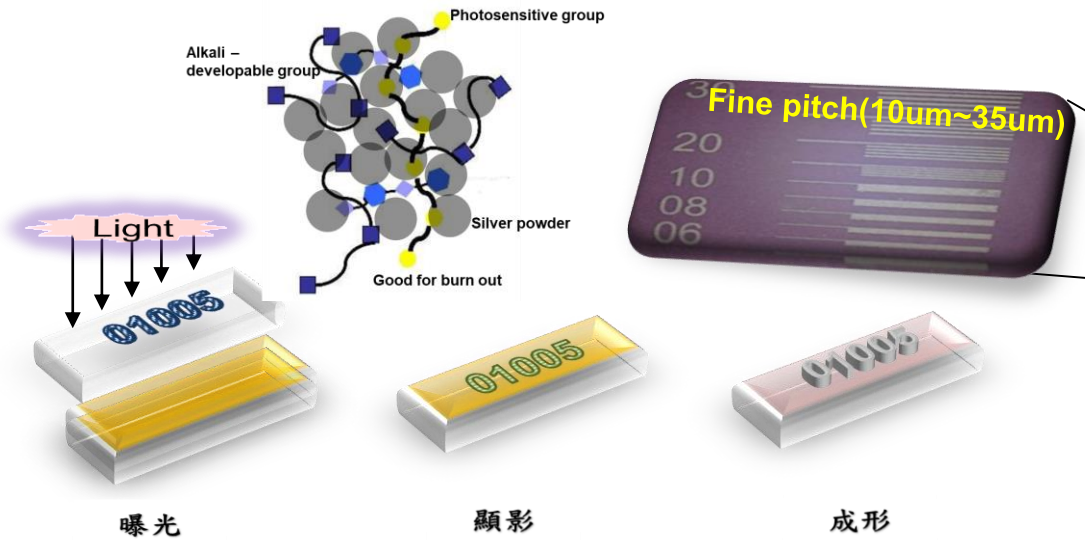
Organic material control and adjustment (Printing ability)

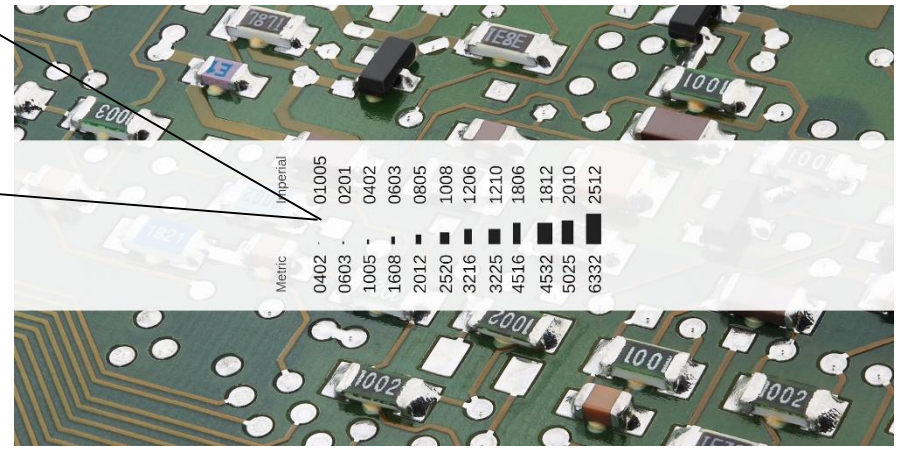
Surface modification of silver powder (Thermal Endurance)

Internal electrodes of microchip

- Major breakthroughs and achievements have been made in the surface modification of silver powder through Industry-Academic plan with NCKU and technical cooperation.
- **Organic material control and adjustment :** Improve printing ability through adjust molecular weight.、viscosity、additive. Finally used rheometer to experiments.
- **Surface modification of silver powder:** Through the surface coating of silver powder with different materials, establish TMA data analysis to observe the improvement of heat resistance and shrinkage behavior. Eventually meet the needs of Micro-lines(~30um).

Lithography Metal Paste



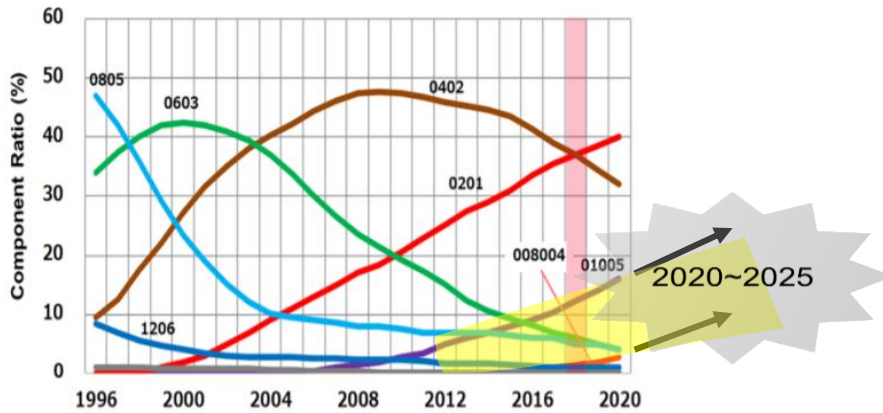


◆ **Product Features:**

Application in Fine pitch Inner layer electrode for smaller size component (01005).

- **Negative tone silver paste**
- **Design for alkaline developer**
- **Vertical sidewalls**
- **Near UV(350-405nm) Processing**
- **Application for High-Q Chip**

Under Development



☐ **Production apacity shift to smaller size & High cap**

Reference form :Kitron's Electronic components market research report

Lithography Metal Paste

獎 狀

謝佳君 同學

參加 2020 中國化學會年會暨研討會 海報競賽

經評定榮獲 **特優獎** 特頒此狀，以資獎勵。

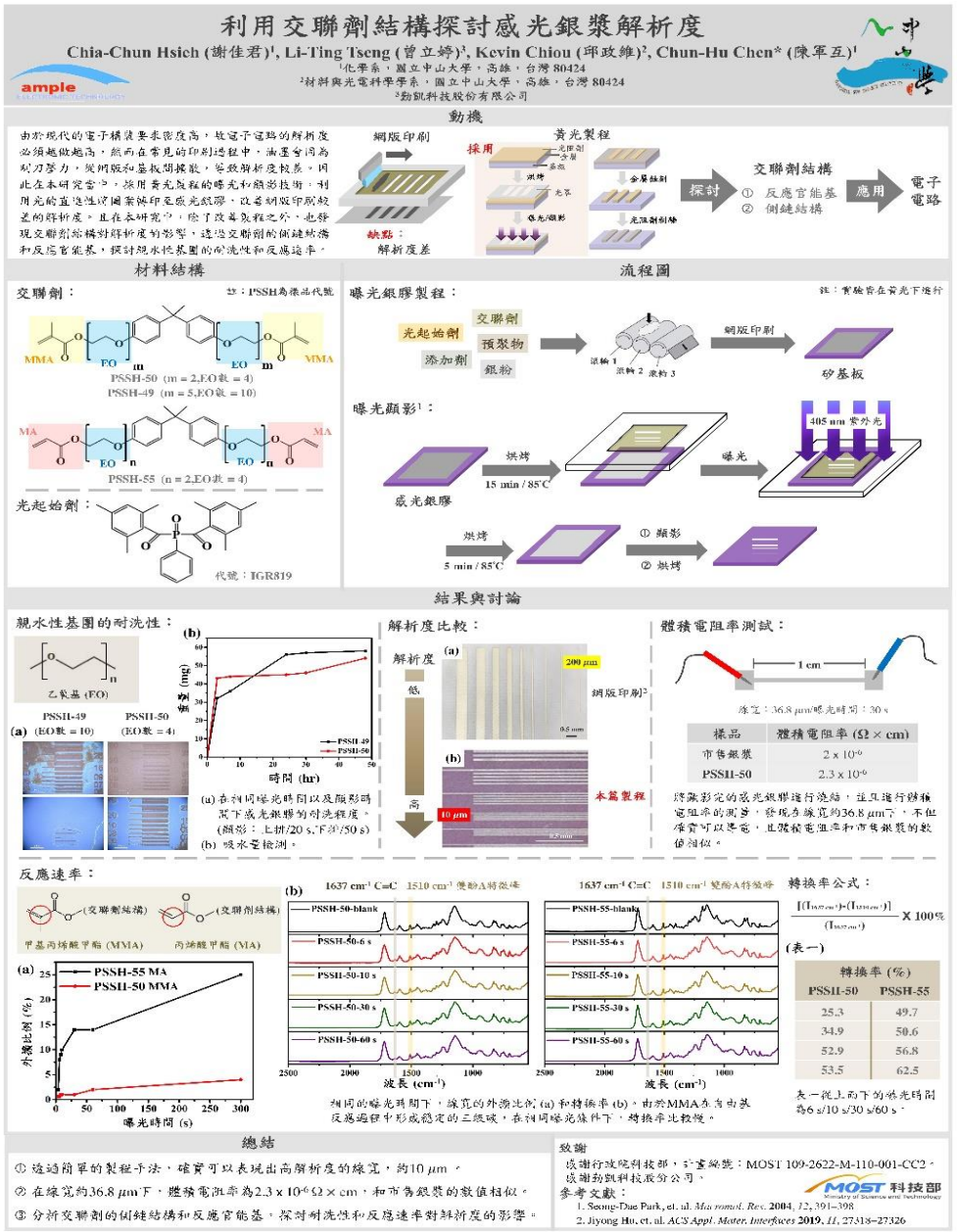
中國化學會
高雄分會理事長 吳明忠

中華民國 109 年 12 月 12 日

Certificate of Merit

by the Kaohsiung Branch, Chemical Society Located in Taipei
for『Poster Competition』 **Excellent Achievement Award.**

Professor Ming-Jung Wu
President
Kaohsiung Branch
Chemical Society Located in Taipei
12th December, 2020



樣品	體積電阻率 (Ω × cm)
市售銀漿	2×10^{-6}
PSSH-50	2.3×10^{-6}

轉換率 (%)	
PSSH-50	PSSH-55
25.3	49.7
34.9	50.6
52.9	56.8
53.5	62.5

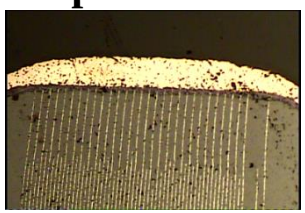
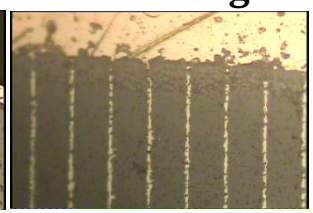
High-Temperature Sintered Copper Paste for MLCC Outer Electrode

◆ Industry Trends :

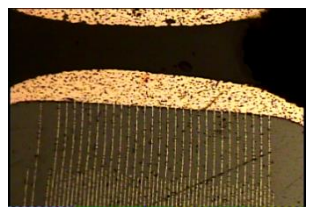
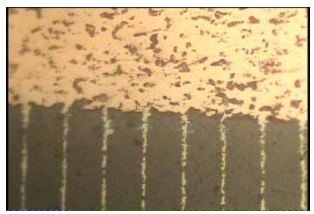
ITEM	Miniature	Small size	Normal	Big size
	PC65751	PC6199	PC6088	PC6100
Curing temp. (℃)	870~890	830~850	850~890	850~890
Size range(inch)	01005	0201	0402~0805	1206~1812
Advantage	Ni penetration	Tin spray	Pin hole、Tin spray Bending、TC crack	
產業趨勢	←		→	

◆ Technical Achievements :

- **Lead-free zinc oxide glass frit diffusion control technology prevents vertical cracking issues**

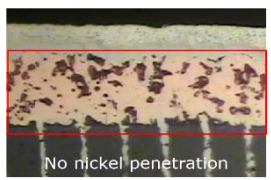



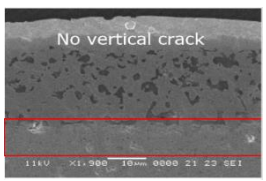
*No Diffusion Control: ZnO Diffusion around 10~15um

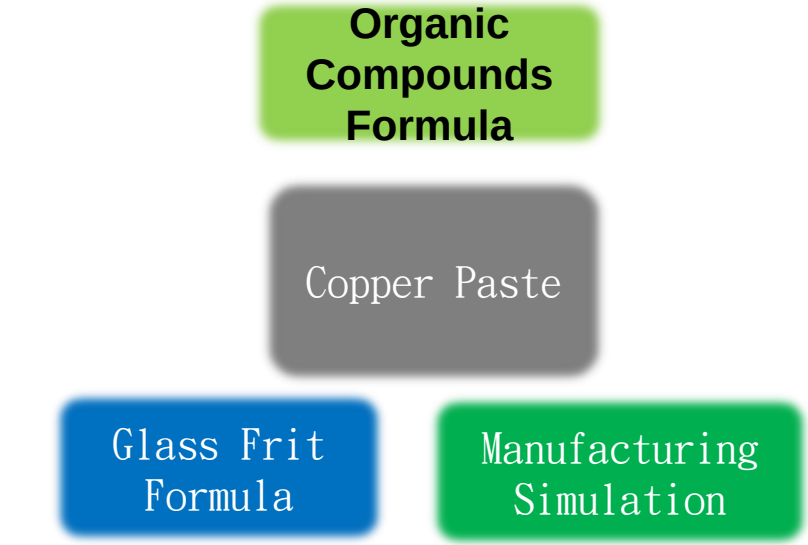
*Ample Diffusion Control: ZnO Diffusion around <5um

- **Glass frit formula increases acid resistance and anti-nickel permeability**





◆ Core Technology :



- **Organic Compounds Formula: Produces excellent dipping flatness and low dipping loss.**
- **Glass Frit Formula: Increases acid resistance of organic vehicles and maintains binding capability, which leads to better anti-nickel permeability and crack prevention.**

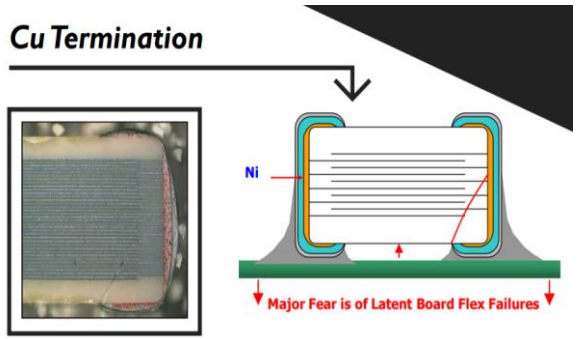
Low temperature cure Pastes for Terminal Electrodes

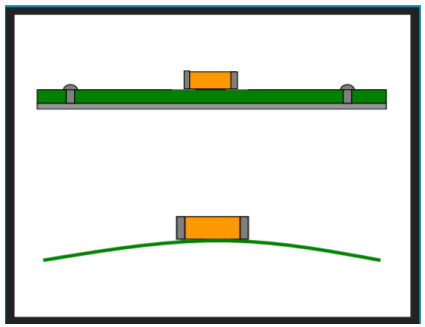
◆ Application Trend :

Industrial Electronics | Consumer Electronics | Wearable Devices | Automotive Electronics

What happens if the board flex is coming from any other known cause?

- ICT pin induced board flexure
- Board flexure occurring during PCB assembly into fixtures / cases etc.
- Insertion / removal of PCBs from connectors etc.
- PCB thermal expansion / contraction causing mechanical damage to the MLCC.



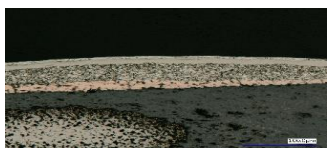


Reference from AVX Company :Flexisafe MLCC Termination Device Analysis Report

◆ Product Features : Used for terminal electrodes of passive components for surface mounting, such as resistors, MLCCs and inductors.

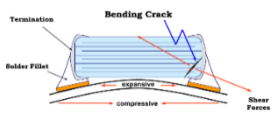
- **Good Dipping Flatness**

- **Nickel Electroplatable**



- **High Bending Resistance**

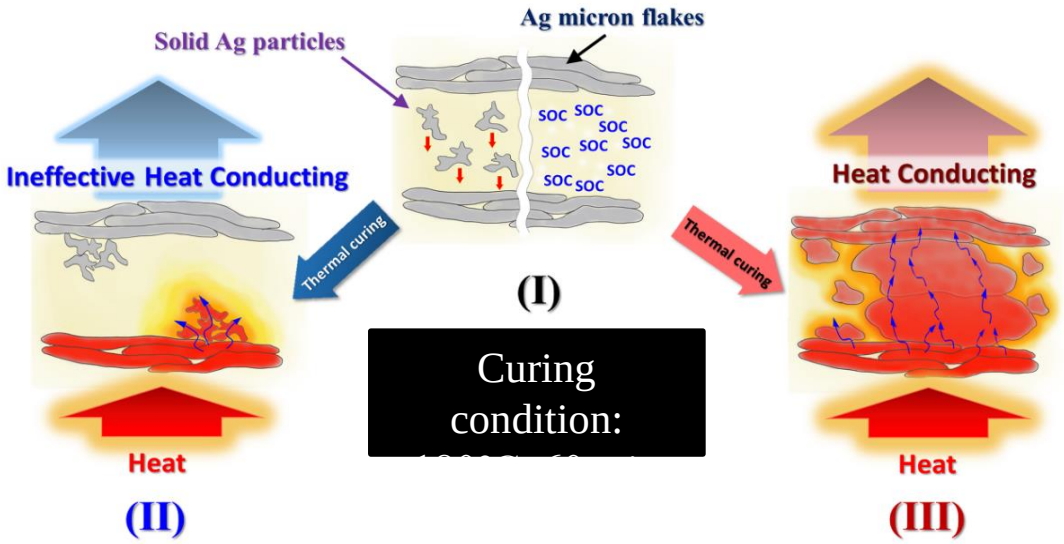
Item	EP9130	Reference (without epoxy termination)
bending	> 10mm	2~3mm

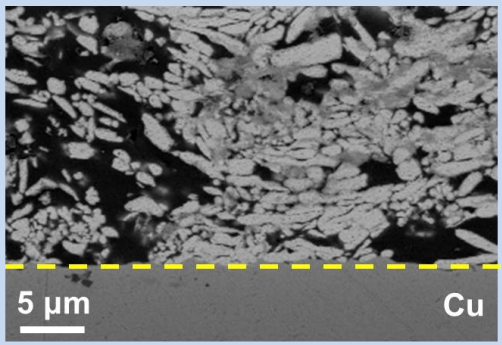


- *IEC 60068-2-21 : Speed < 0.5mm/sec ,Stop on 10 sec,△R25/R25 ≦5%*

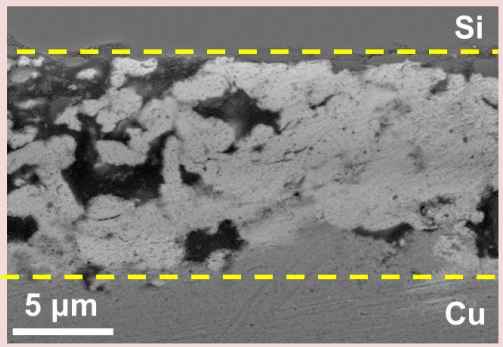
Semiconductor packaging die-attach Ag adhesive

■ Applied on LED **thermal conductive** die-attach adhesive and power semiconductor packaging

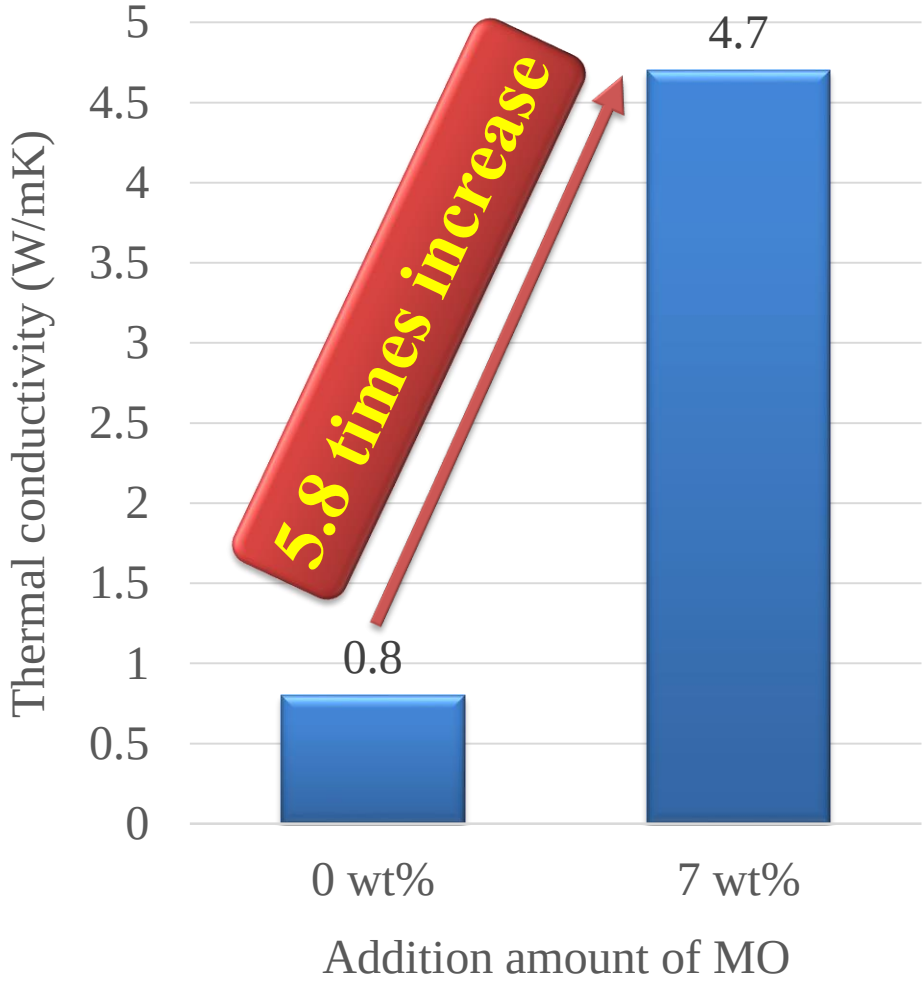




Conventional Ag paste



MO paste



- ***SOC=MO=Silver–organic complex***

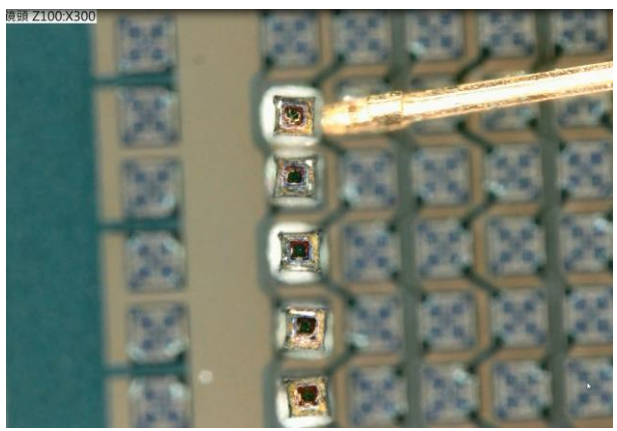
- ***The industry-university cooperation with Sun Yat-sen University has achieved major breakthroughs and achievements in MO synthesis.***
- ***Development status: customer testing***

ACS Appl. Electron. Mater. **2019**, *1*, 1890−1898.

Development of New Technologies

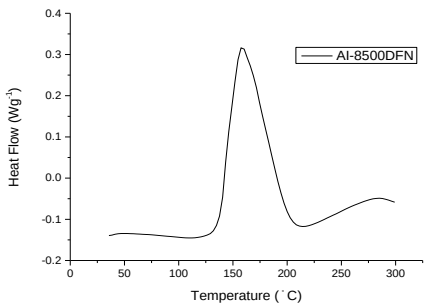
Mini-LED Opportunity and Application for Die Attach Ag Glue

- For smaller LED chips die attach shall apply the smaller needle for speeding up dispensing Ag glue to substrate to reach UPH higher than 10,000.
- By using Rheological analysis technology to optimize the Ag glue recipe for lower glue spilling and EBO to overcome the impact of cross talk.
- By using DSC (Differential Scanning Calorimeter) analysis technology to optimize Ag glue recipe for lower curing temperature to enhance LED chips array alignment accuracy.
- To enhance the adhesion.
- For rapid repair failure LED chips.

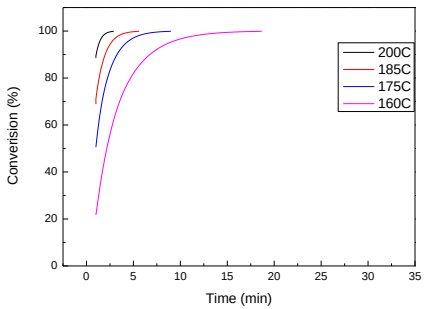


- ***Status: In Customer testing.***
- ***Technology Cooperation with NCTU.***

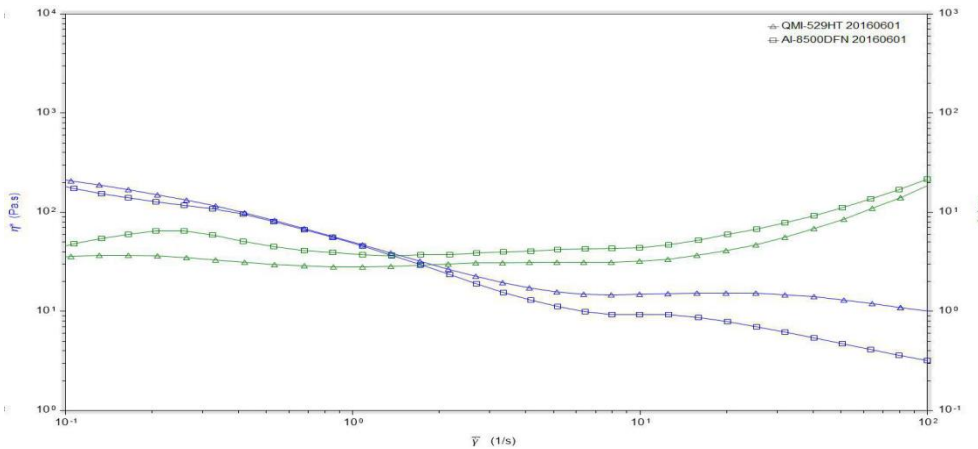
■ Core-Technology :



Pic1. DSC Analysis for curing temperature



Pic2. Curing transforming ratio simulation vs temperature and curing time.



- Ag glue viscoelasticity represent its cohesion, under the reaction of external force, silver glue has a mechanical property of both solid elasticity and liquid viscosity (plasticity).
- The wire drawing of silver glue is short, and it shrinks quickly after breaking, so it has strong viscoelasticity and is suitable for fast dispensing.

Heat-conducting of graphene

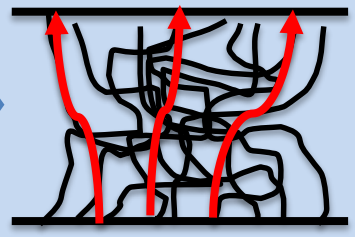
Schematic diagram of heat conduction path

Ineffective heat-conducting of z-axis

Two-dimensional stacked graphene

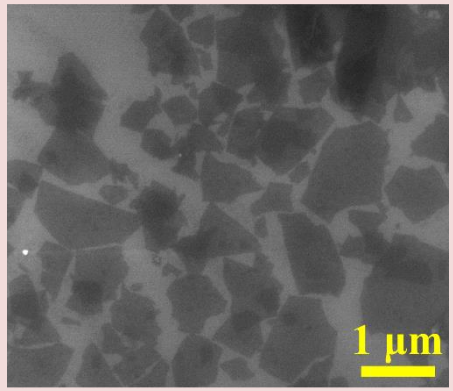
treatment

Effective heat-conducting of z-axis



Three-dimensional creased graphene

Schematic diagram of structure



Two-dimensional stacked graphene

Diagram of three-dimensional creased graphene

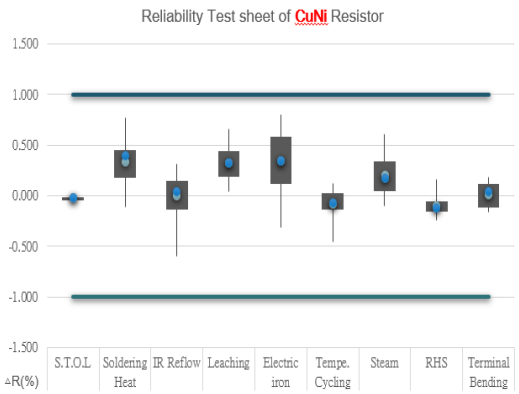
Material property	Two-dimensional stacked graphene	Three-dimensional creased graphene
Dispersion	Worse	**Excellent**
Heat-conducting	Restricted on x and y-axis	**Effective on all three axis**
Maximum use	Low	**High**

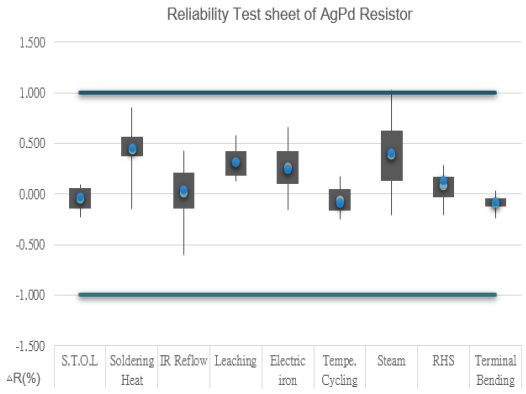
- ***Currently in the development of industry-university cooperation with Sun Yat-sen University.***

Resistor BME Process Trend and Core of Copper Positive Conduction Technology

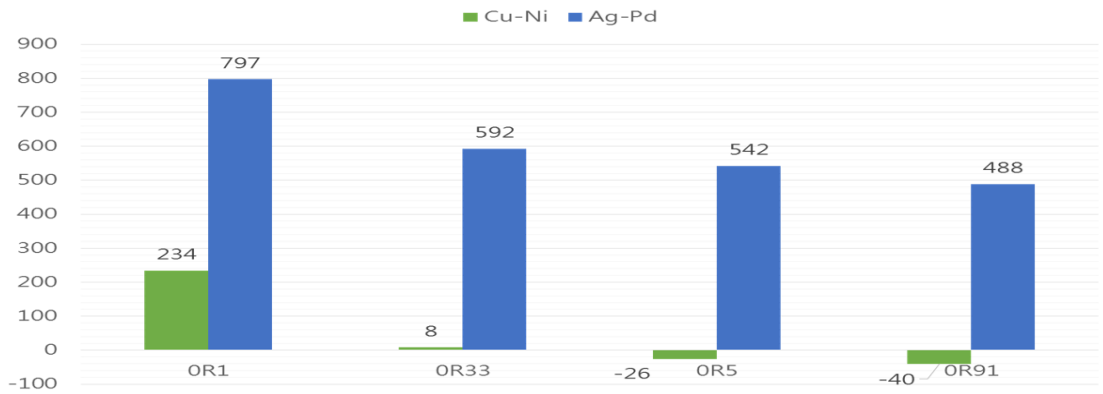
◆ **Industry Trend: Reliability performance in high temperature and high humidity environment**

•After 1000 hours of life test, it is almost the same as the silver palladium resistance level。





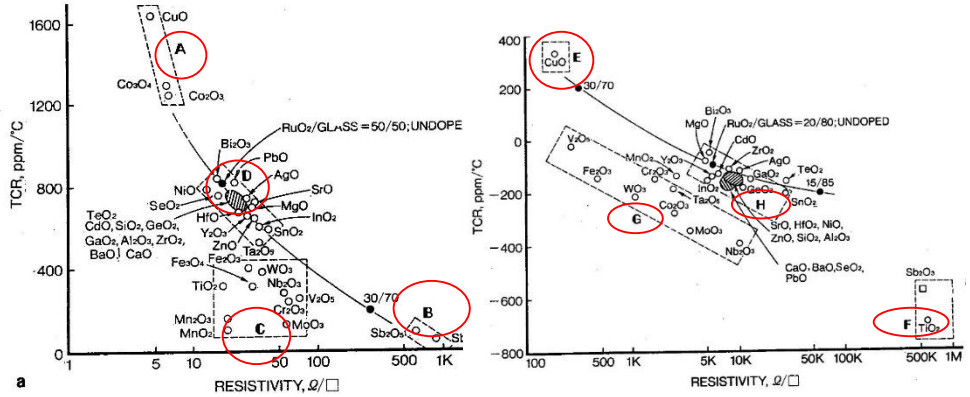
TCR test is better than silver palladium resistance



◆ **Core Technology**

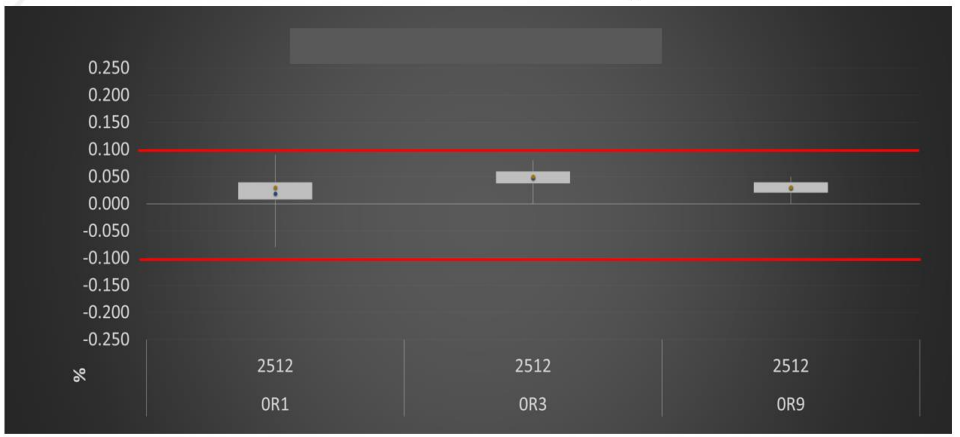
Glass modification (Chemical resistance)

Temperature coefficient control (Directivity)



添加物區域代稱	添加物種類	電阻率	TCR 移動方向
A , E	CuO、Co_2O_3	降低	正方向
B , F	Sb_2O_3、Nb_2O_3、TiO_2	升高	**負方向**
C , G	V_2O_3、Cr_2O_3、Fe_2O_3、MoO_3	不變	負方向
D , H	MgO、PbO、SnO_2	不變	不變

•After 1000 hours vulcanization environment test at 115℃, the change rate is less than ±0.1%。



● **Quality advantage: When the copper positive conductor replaces silver, the application of 5G base stations can improve the problem of silver dissociation in high humidity and high temperature environments.**

願景

凱歌長奏盛名揚

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