THE EFFECTS OF SILVER OXALATE AND NANO SILVER POWDER ADDITIONS ON THE PERFORMANCES OF THE METALLO-ORGANIC DECOMPOSITION SILVER PASTE

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In the literature, it was known that the additions of metallo-organic decomposition (MOD) agents in the silver pastes would result in the low curing temperatures and the low electrical resistivities of the films, which is beneficial for use in the flexible electronics applications. In this study, silver oxalate and silver nano-particle were added in the MOD silver pastes. Silver oxalate, which is a transparent crystal, was prepared by mixing the silver salts and the soluble oxalates in the aqueous solution. As the temperature reaches the decomposition of silver oxalate, the decomposition of the silver oxalate in the paste releases a large amount of heat, which induces the chain decomposition reaction of the MOD agent and the melting of silver nano-particles. This lowers the curing temperature of the MOD silver paste and enhances the electrical connectivity and packing density of the silver particles. The phenomena is evidenced by the DTA and TGA analysis. The electrical properties of the films were measured using four-point probe method at the curing temperature of 180°C. The results indicate that electrical resistivities of $< 20\mu\Omega$-cm were obtained.

References:

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Figures:

[1] The diagram of low temperature silver paste composes for MOD agent and low temperature induced agent addition.

[2] The figure of DTA analysis was shown the different exothermic peak for silver oxalate ($Ag_2C_2O_4$) and silver 2-ethylhexanoate ($C_8H_{15}O_2Ag$).

[3] The figure of resistively was indicated the different additions in low temperature curing silver paste.

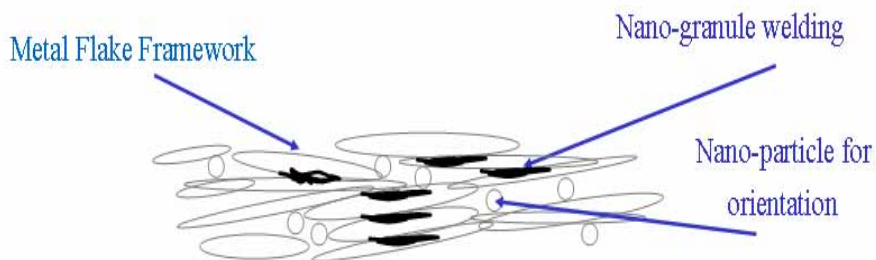

Figure 1

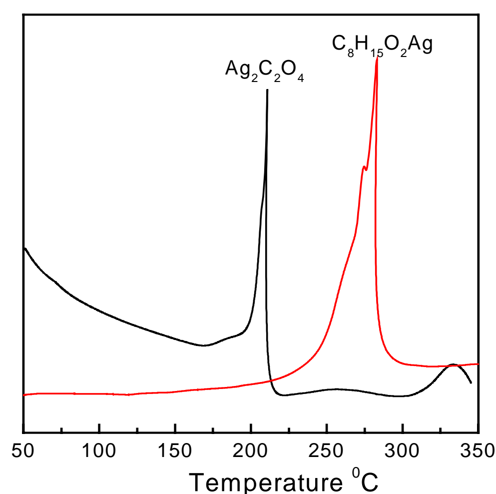

Figure 2.

Table 1

Conditions	Curing Temperature ( ) Dwell time: 10min	Resistivity (μΩ-cm)
Pure Flake Silver Paste	150	709.7
	200	15.8
Added Silver 2-ethylhexanoate	150	437.1
	200	12.1
Added Silver Oxalate	150	135.5
	200	47.1
Added Silver 2-ethylhexanoate and Silver Oxalate	150	25.7
	200	14.2