

PROCESSING

N87-16420

METALLO-ORGANIC DECOMPOSITION (MOD)
FILM DEVELOPMENT

ELECTRINK, INC.

J. Parker

MOD Film Materials (Materials Made)

<u>I</u>	<u>Organometallic Compound</u>	<u>Purpose</u>
A	Silver neo decanoate	contact and circuit conductors
B	Bismuth 2-ethylhexanoate	adhesion enhancer for use in mixed organometallic solutions
C	Platinum 2-ethylhexanoate	to improve solder leach resistance in mixed systems
D	Nickel neo decanoate 2-ethylhexanoate	reduced cost solder leach resistance agent, barrier film possibility
E	Gold 2-ethylhexanoate	contact and circuit conductors
F	Aluminum neo decanoate	back surface field alloy ceramic layer
G	Mixed organometallics	various, eg. see above



PROCESSING

MOD Film Materials (Compound Information)

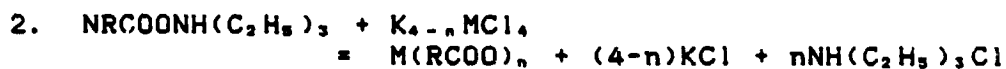
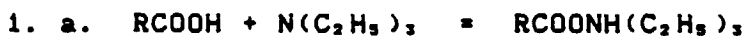
Product Compound	% Metal in compound	Decomp Temp. °C	Reagent compound	Metal Density gm/cc	metal Valence
Ag(C ₉ H ₁₉ COO)	38.7	230	AgNO ₃	10.5	<u>1</u>
Bi(C ₇ H ₁₅ COO) ₃	32.7	250	Bi(NO ₃) ₃	9.8	<u>3</u> , 5
Pt(C ₇ H ₁₅ COO) ₂	40.5	210	K ₂ PtCl ₆	21.4	<u>2</u> , 4
Ni(C ₉ H ₁₉ COO) ₂	14.6	310	Ni(NO ₃) ₂	8.9	<u>2</u> , 3
Ni(C ₇ H ₁₅ COO) ₂	17.0	300	"	"	" "
Au(C ₉ H ₁₉ COO) ₃	27.7	-	KAuCl ₄	19.3	1, <u>3</u>
Au(C ₇ H ₁₅ COO) ₃	31.4	-	"	"	" "
Al(C ₇ H ₁₅ COO) ₃	5.9	-	Al(NO ₃) ₃	2.7	<u>3</u>

MOD Film Materials (Chemical Reactions)

A Strong Acid Salts



B Weak Acid Salts



RCOOH is either neodecanoic acid, C₉H₁₉COOH or 2-ethylhexanoic acid, C₇H₁₅COOH.

M is metal which has a valence n.

PROCESSING

Mixed Organometallics

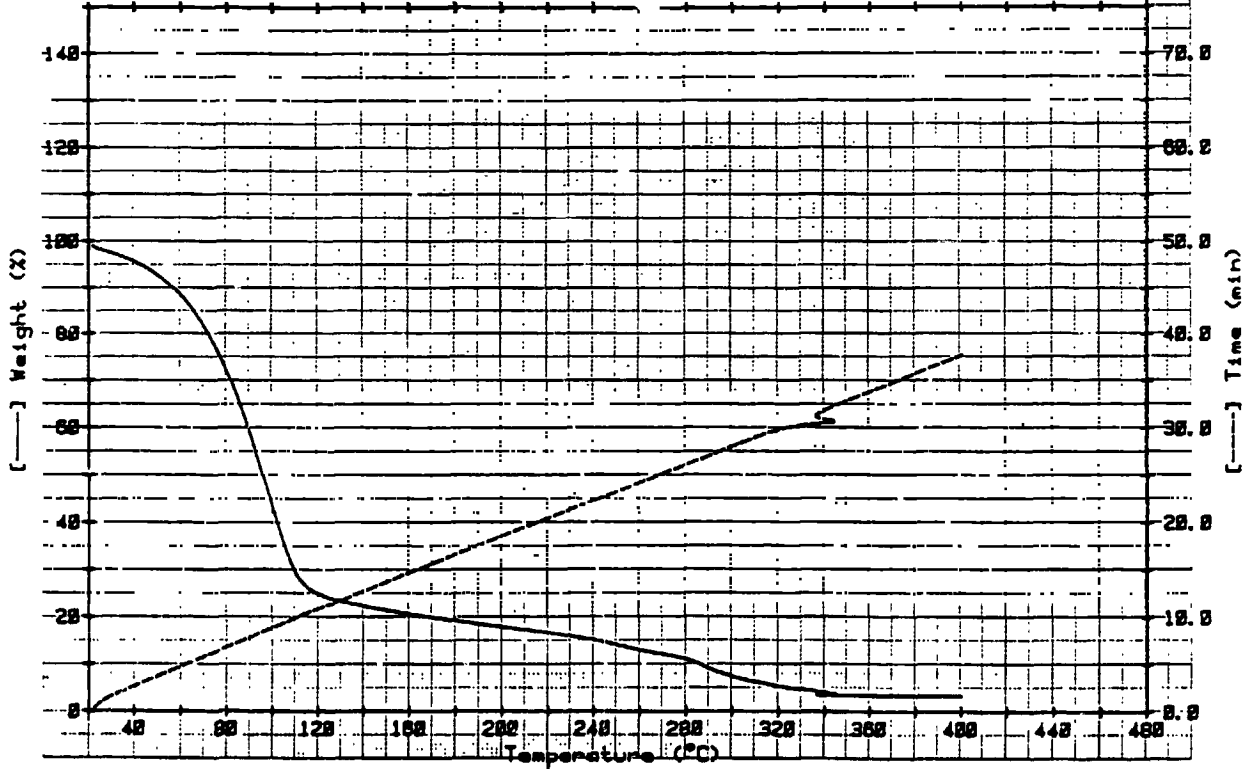
The adhesion of silver Metallo-Organic Decomposition (MOD) films is substantially improved by a small addition of bismuth which after oxidation during firing may serve as a bonding frit. Solder leaching of the metal film is reduced by the addition of a small amount of platinum. Both the bismuth and the platinum are added to the silver neodecanoate in xylene as the 2-ethylhexanoate. This mixed solution is designated AGS 13.30 and has the composition given in the table below.

Solution Composition				
Compound	% Compound in Solution	% Metal in Compound	% Metal in Solution	% on Metal Solids
Silver Neo Decanoate	30.00	38.7	11.61	95
Bismuth 2-ethylhexanoate	0.37	32.7	.12	1
Platinum 2-ethylhexanoate	1.21	40.5	.49	4
Xylene	65.42	-	-	-
	----- 100.00			----- 100

PROCESSING

Thermogravimetric Analysis: Ni 2-Ethylhexanoate

Sample: NI 2-ETHYLHEXANOATE Date: 29-Jan-86 Time: 7:29:34
Size: 67.97 mg File: 86.02.85-TGA.02
Rate: 10-100 PT/N2 Operator: RHF
Program: Extended-Playbook V2.0 Plotted: 29-Jan-86 9:21:50



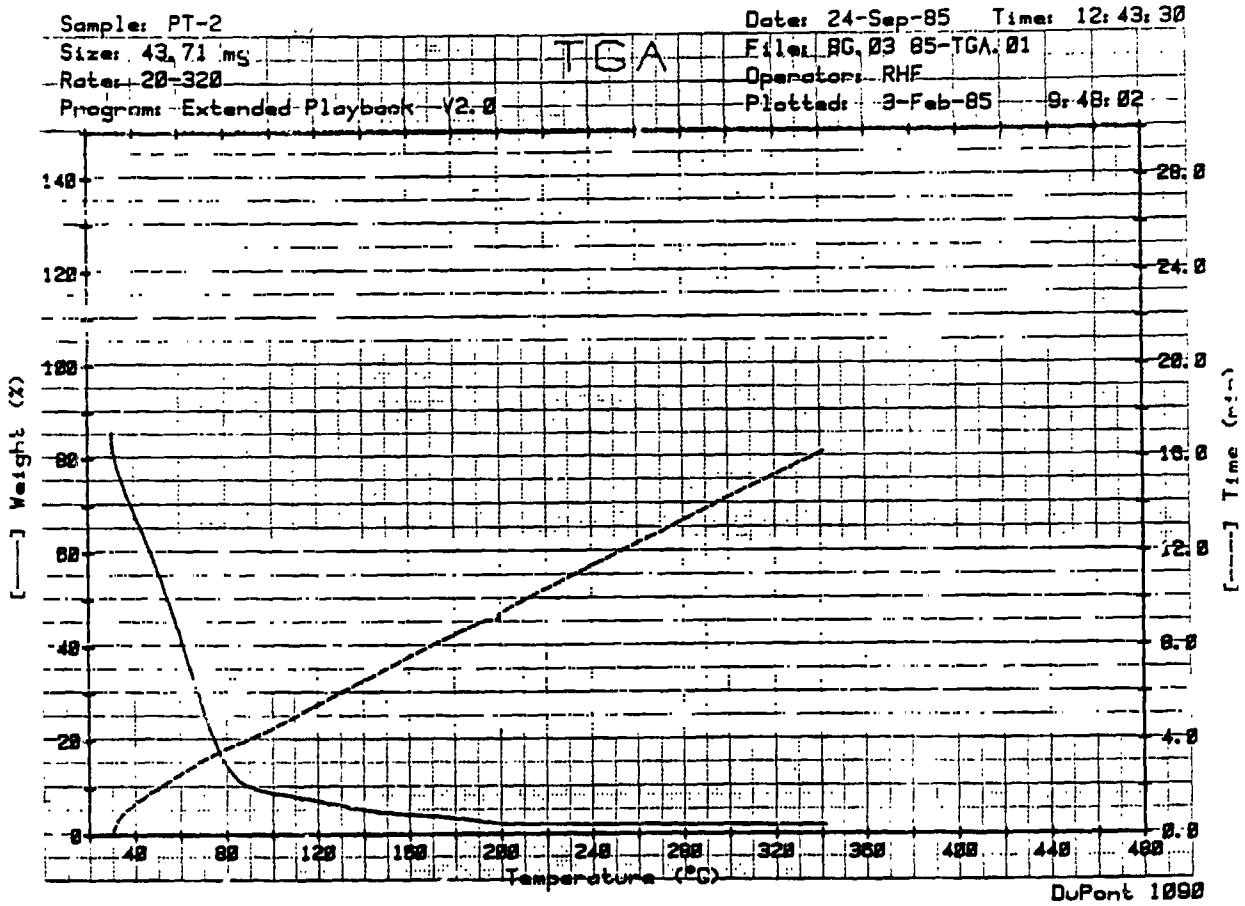
DuPont 1090

ORIGINAL PAGE IS
OF POOR QUALITY

PROCESSING

ORIGINAL PAGE IS
OF POOR QUALITY

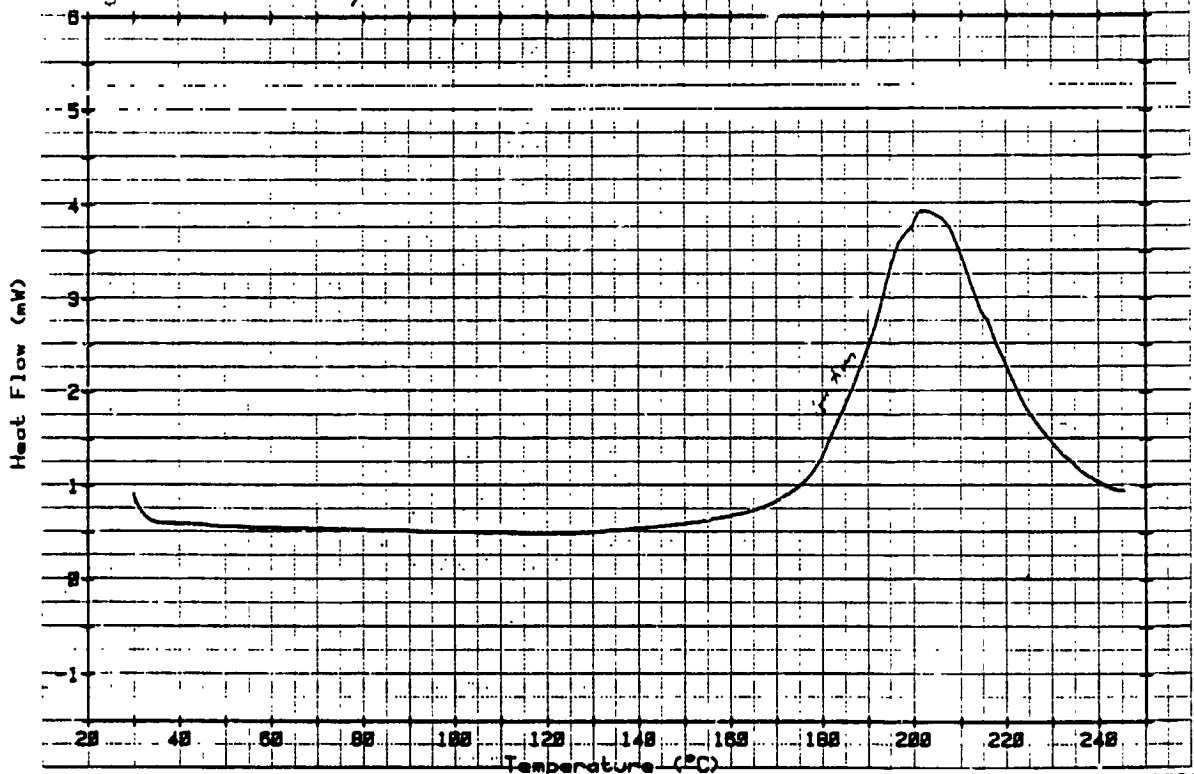
Thermogravimetric Analysis: Pt 2-Ethylhexanoate



PROCESSING

Differential Scanning Calorimetry: Pt 2-Ethylhexanoate

Sample: PT-2 Date: 31-Jul-85 Time: 15:58:22
Size: 0.60 MG 100 CC/MIN D2 DSC File: BG 02 85-DSC.25
Rate: 10 DEG C/MIN Operator: RHF
Program: Extended-Playback V2-0 Plotted: 3-Feb-85 8:30:10



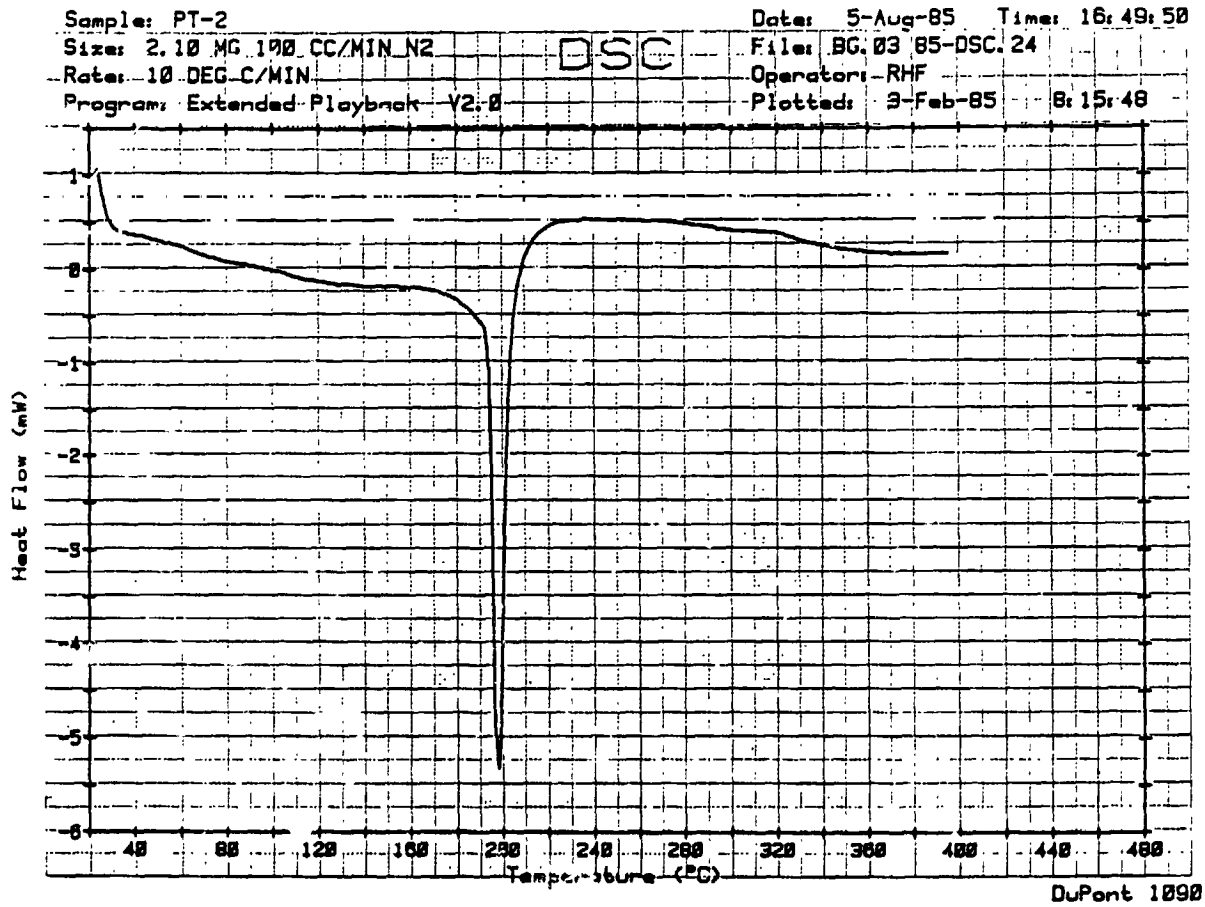
DuPont 1090

ORIGINAL PAGE IS
OF POOR QUALITY

PROCESSING

ORIGINAL PAGE IS
OF POOR QUALITY

Differential Scanning Calorimetry: Pt 2-Ethylhexanoate



PROCESSING

Thermogravimetric Analysis of 42.4% Silver Neodecanoate in Xylene (50°C/min)

Sample: AG-22.8% 4-18-85

Date: 3-May-85 Time: 11:09:43

Size: 78.18 mg

File: BG.03 85TGA.02

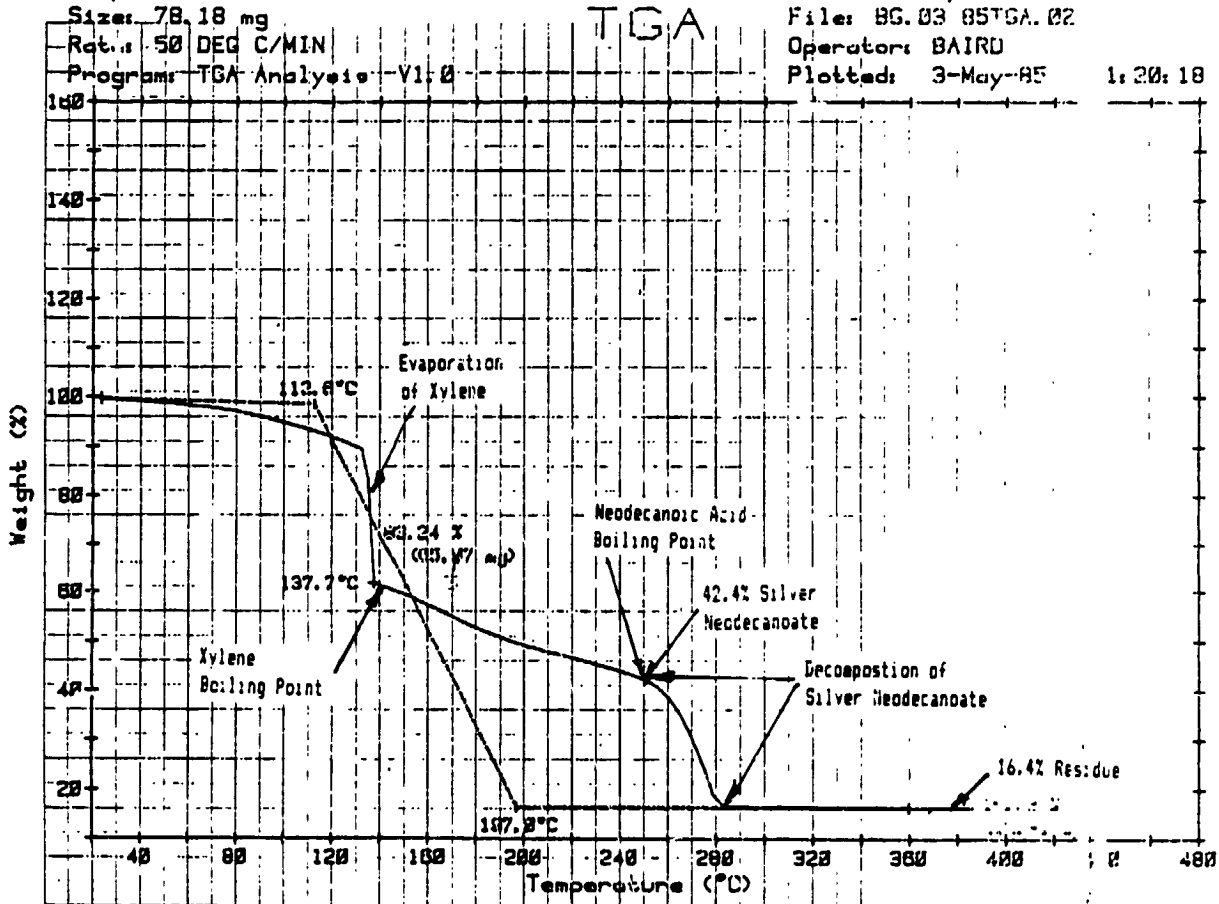
Rate: 50 DEG C/MIN

Operator: BAIRD

Program: TGA Analysis V1.0

Plotted: 3-May-85

1:20:18



ORIGINAL PAGE IS
OF POOR QUALITY

PROCESSING

Differential Scanning Calorimetry of 23% Silver Neodecanoate in Xylene (10°C/min)

Sample: SILVER INK Ag₂₃ in xylene
Size: 38.6 MG
Rate: 10 DEG C/MIN IN AIR
Program: Interactive DSC V2.0

DSC

Date: 1-Dec-83 Time: 11:21:09
File: BG.02 83-DSCDAT-31
Operator: FRONSON
Plotted: 7-Dec-83 10:57:50

