

ACI Alchemy Conductive Inks

Semi-Sintering Conductive Inks - Provisional Data Sheet



Introducing the ACI Alchemy Conductive Series

Easy-to-use, like silver polymer thick film (PTF), silver inks and coatings with the superior electrical performance of sintered nano inks.



Alchemy Series

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Product Description

ACI Alchemy Conductive Inks are a series of highly conductive semi-sintering or hybrid type formulations that enable a range of advantages to current users of silver polymer thick film (PTF) and nanoparticle-based inks, pastes, and coatings. These formulations offer the ease of use and processing of PTF inks and coatings, but with the superior electrical performance of sintered nano inks.

Product Benefits

Material cost savings	The low volume resistivity (high conductivity) of the materials and ability to print thinner films enable lower cost in use compared to traditional percolation type conductors
Higher power/current density applications	Ability to sinter at greater film thickness than nano inks allows for low resistivity AND low sheet resistance films able to carry more current or power without overheating
Superior mechanical performance (flex and crease)	The ability to print much thinner films with equivalent sheet resistance to PTF conductors allows for superior flex ductility and hard crease resistance
Higher resolution printing	The small particle size of the formulations allows screen printing, microdispensing, jetting and spraying of finer interconnects
Higher speed curing	Curing rate often limits the use of nanoinks, however these formulations cure at rates amenable to traditional screen-printing dryers
Solder paste wettability	Alchemy inks wet nicely by BiSn(Ag) low temperature solder pastes, so on some substrates reflow solder-based attach may be possible
Environmental stability	No change in temperature/humidity aging

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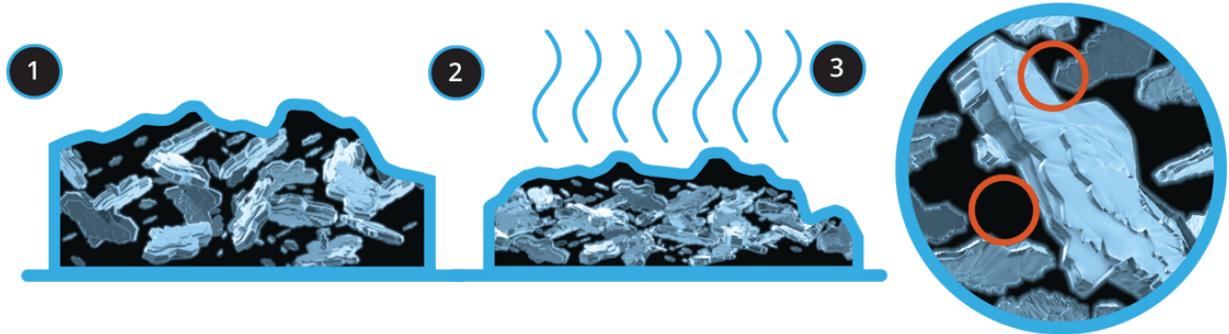
Alchemy Series Qualities

Alchemy Series Typical Performance		
Volume Resistivity (150oC cure) Excellent low temperature cure performance as	$\leq 0.003 \Omega/\text{square}/\text{mil}$ $\leq 8 \times 10^{-6} \Omega \cdot \text{cm}$	
Sheet Resistance	0.004 Ω/sq up to 0.030 Ω/sq	
Cross Hatch Tape Adhesion ¹	5B on DuPont Melinex ST506	
	RD0117B	RD0117C
Physical State	Paste	Paste
Color	Silver	Silver
Viscosity ²	45 Pa·s	40 Pa·s
Density	3.39 g/mL	3.14 g/mL
Percent Solids ³	79%	76%
Shelf Life at 20°C	6 Months	
Typical Processing Parameters		
Deposition methods	Screen, MicroDispense Direct Write, spray, jet, etc.	
Curing Time and Temperatures (Contact for application specific guidance)	150°C for 15 minutes in box oven 150°C \leq 5 minutes in conveyor oven	
Some Recommended Screen Meshes (Contact for application specific guidance)	230 TPI, 0.0011" stainless steel or similar 420 TPI, 26-27 μm PET for cost reduction appl.	
Recommended Cured Thickness	2.5 μm to 10+ μm	
Coverage	40 m ² /kg / 10 m ² /kg	
Recommended Thinner/Diluent	Depends on grade please contact	
Clean up	Acetone / MEK / Similar Solvents	
¹ ASTM D3359 Method B ² Anton Paar MCR302, 10 s ⁻¹ , 50mm Parallel Plate, 0.250mm Gap, 25°C ³ 150 °C for 120 minutes in box oven		



Alchemy Series inks compared to traditional conductors

How traditional percolation and polymer thick film inks work

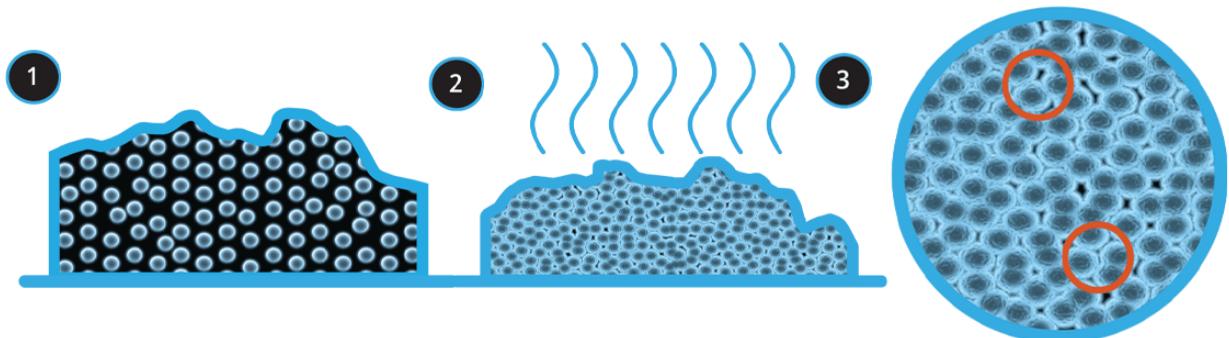


Wet as Printed

After Drying

Polymer & "lubricants" from flaking create contact "resistance". Resin at substrate interface provides adhesion.

How nanoparticle based inks work

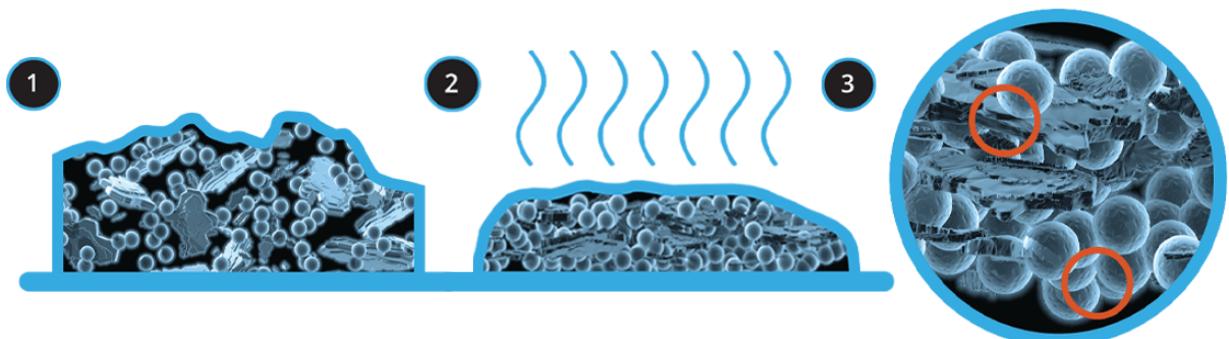


Wet as Printed

After Drying

Sintering yields no contact resistance. Difficult to get resin to substrate without hurting resistivity.

How ACI Alchemy hybrid or semi-sintering inks work better



Wet as Printed

After Drying

Some sintering between particles and high aspect flakes. Higher resin content than pure nano sintering materials yield superior adhesion

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Caution

Proper industrial safety precautions should be exercised in using these products. Use with adequate ventilation. Avoid prolonged contact with skin or inhalation of any vapors emitted during use or heating of these compositions. The use of safety eye goggles, gloves or hand protection creams is recommended. Wash hands or skin thoroughly with soap and water after using these products. Do not eat or smoke in areas where these materials are used. Refer to appropriate SDS information.

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