

# What is **A-SAP™**?

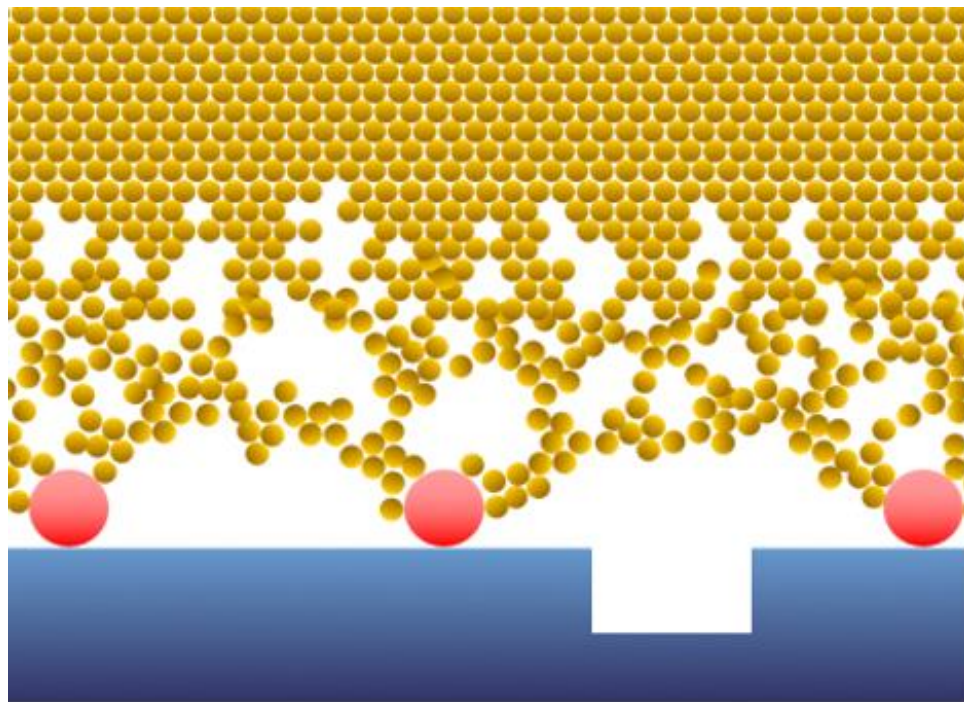
## **Averatek Semi-Additive Process**

This **revolutionary technology** is not a traditional subtractive-etch process: Rather than start with copper-clad laminate, you etch it all off – then put it back. Then you use the electrolytic copper – to whatever height you need, for straight sidewall.

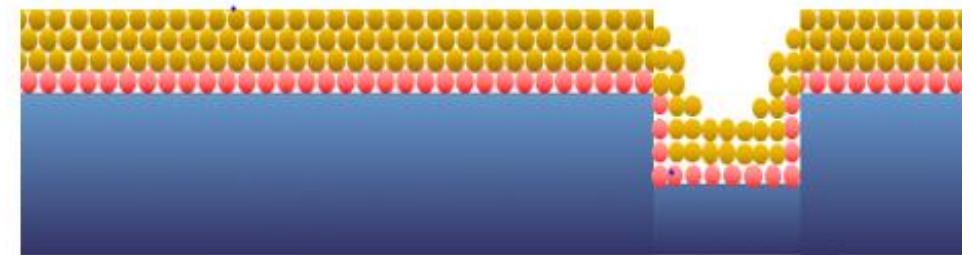
## How is A-SAP™ different from traditional processes?

**A-SAP™** changes the way we work with electroless plating.

Using Liquid Metal Ink™, ultra-dense layers of electroless copper are used to provide a thin, uniform colloidal coating.



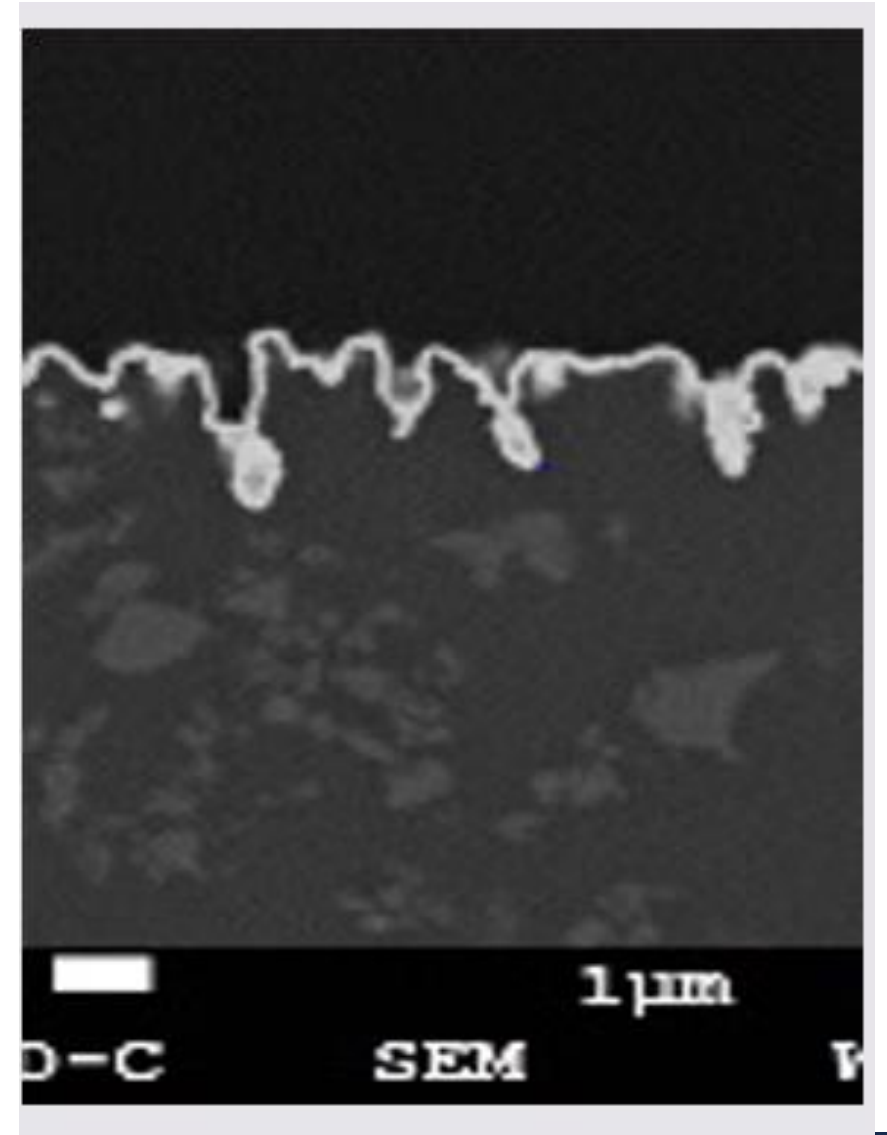
Standard Process



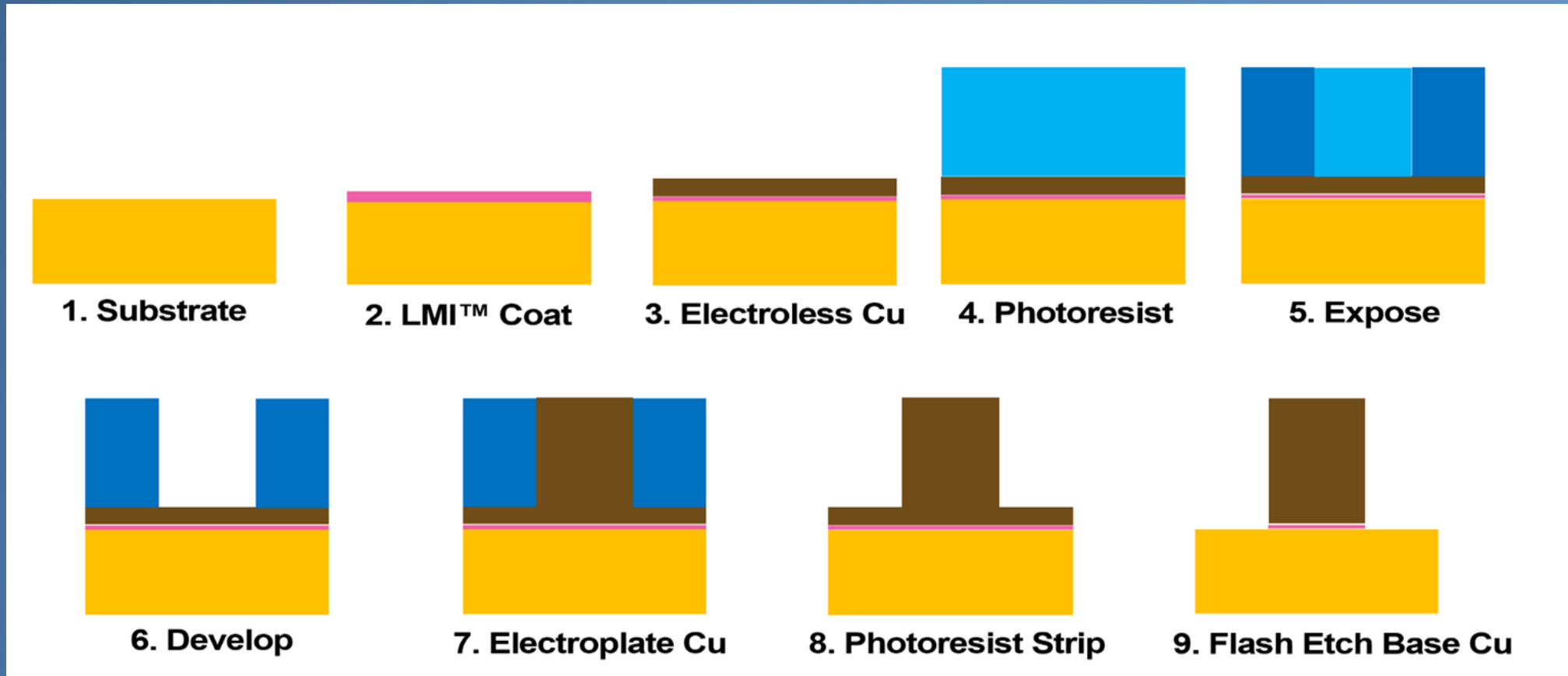
With LMI™

# How is A-SAP™ different from traditional processes?

The process results in a **thin, uniform colloidal coating that fills in gaps.**



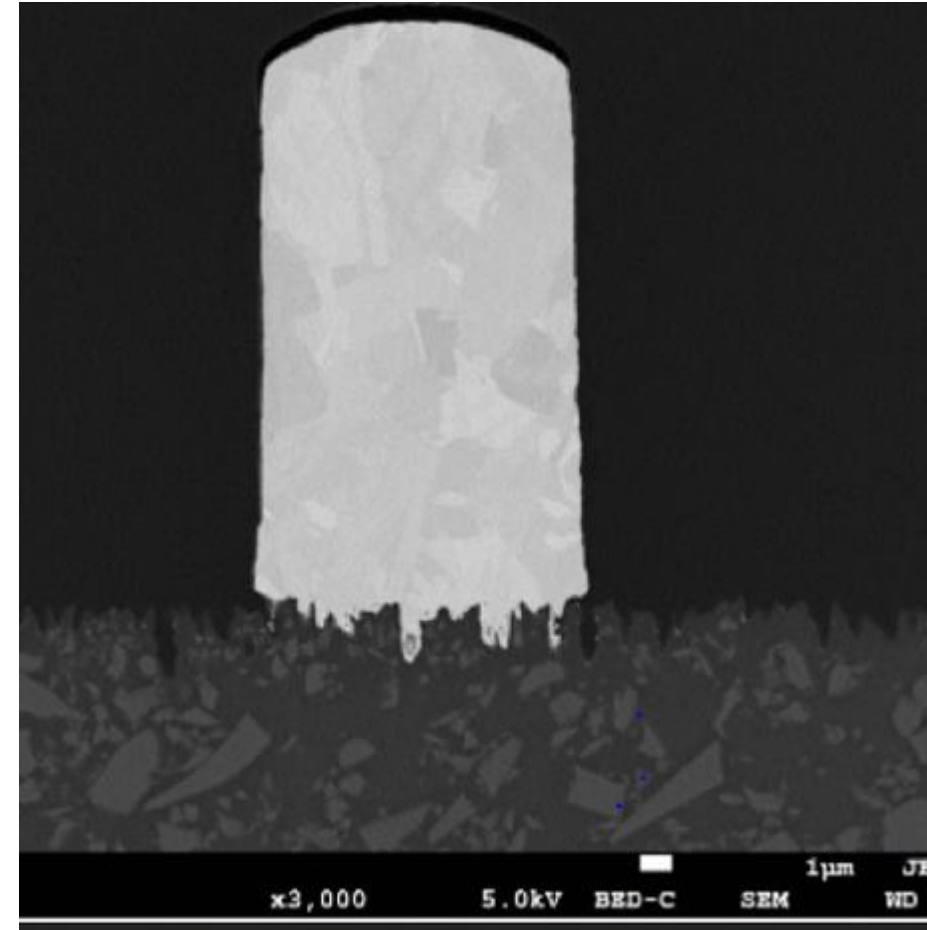
# A-SAP™ Process Flow



# How does A-SAP™ work?

A-SAP™ adds thick copper traces to the very thin copper base layer, creating well defined features that have straight - not tapered - side walls.

The very thin copper base layer is easily removed with light etching, leaving a precise copper circuit behind.



*11 µm wide copper traces on filled resin substrate.  
LMI™ seed layer, pattern plated to 17 µm thick after flash etching.*

(Image courtesy of MEC Corporation)



# Which Materials are Compatible with A-SAP™ ?

Manufacturer	Material	Type
AFT (Ajinomoto)	GX92	BU Film
	GL102	BU Film
AGC Nelco	N4000-29	FR4
	N5000	BT
	N4800-20	Mid Loss
	MW2000	Low Loss
	MW4000	Very Low Loss
	MW8000	Very Low Loss
	Dupont	Pyralux AP
EMC	EM285	HF FR4
	EM526	Mid Loss (HF)
	EM891	Low Loss
	EM890	Very Low Loss (HF)

Manufacturer	Material	Type
Isola	370 HR	FR4
	P96	Polyimide
	I-Speed	Mid Loss
	I-Tera MT40	Low Loss
	Tachyon100G	Very Low Loss
	TerraGreen	Low Loss
Panasonic	Megtron 6	Low Loss
	R-F705S	Flex, LCP
Rogers	RO3003	PTFE
	RO4350	Low Loss

Averatek is working closely with all major laminate suppliers.

These materials have met the  
IPC 4101 slash sheet requirements for peel strength.

# Which Design tools work with A-SAP™?

A-SAP™ is compatible with every electronic design tool: all major software vendors have this new technology under consideration.

The most important Design rule when working with a brand-new technology: be sure to collaborate closely with your fabricator – communication is key.

# Which fabricators are building with A-SAP™ today?

Only select manufacturers with qualified staff and equipment are licensed to utilize the A-SAP™ process.

The Averatek leadership team can refer you to the right one for your project. Contact us to discuss your requirements.



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# How much improvement can be achieved with A-SAP™ in RF impedance variation?

A-SAP™ impedance has been shown to be less than 5% - compared to typical industry tolerances of 10%.

High aspect ratio traces offer electromagnetic advantages:

## 1:1 Aspect ratio or greater

- A-SAP™ enables taller traces
- Excellent mutual inductance
- Reduce the impact of proximity effects
- Easy to get low characteristic impedance values



Ratio of height-to-width of the circuit trace impacts signal integrity

# What about copper adhesion to the dielectric with A-SAP™?

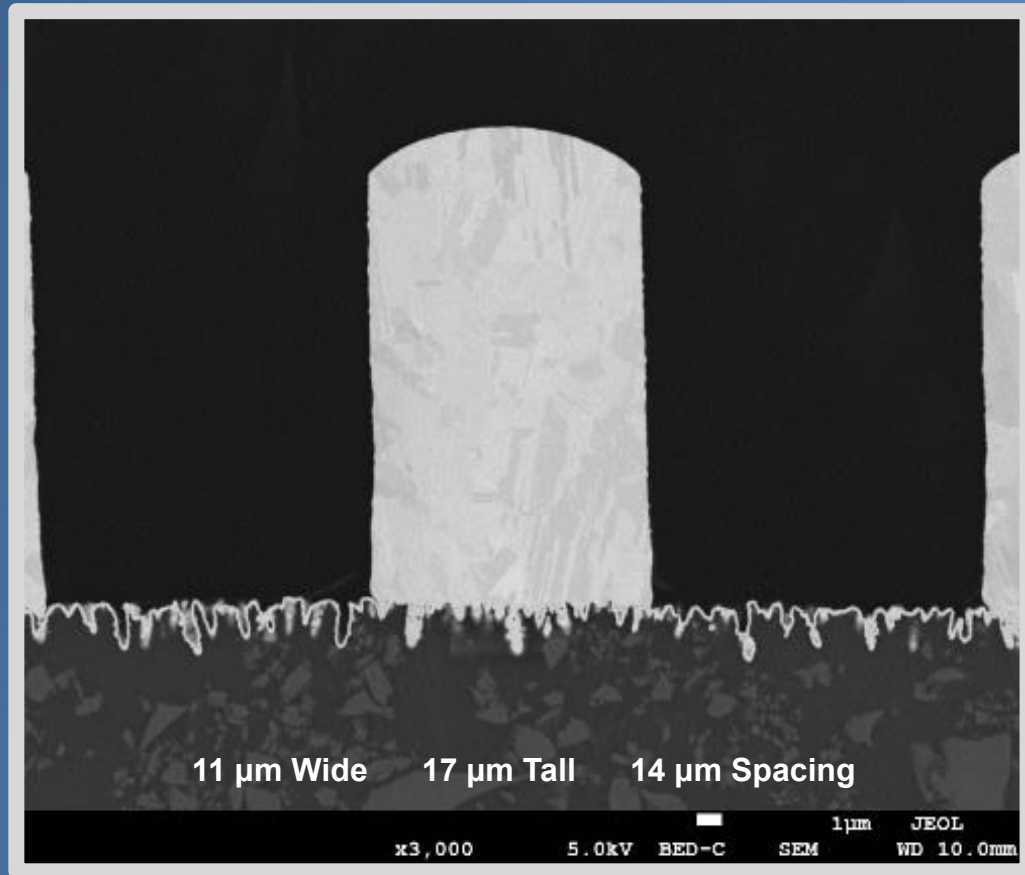
Adhesion is equivalent to – or better – than with traditional processes. Testing is aligned with IPC requirements.

We can discuss details of those test results offline.

Be sure to contact us at [tara@avratek.com](mailto:tara@avratek.com) or [mike@avratek.com](mailto:mike@avratek.com)

How is A-SAP™ different from mSAP(modified Semi-Additive Process)?  
**Very thin** base copper results in very little etching of the trace

A-SAP™



mSAP

