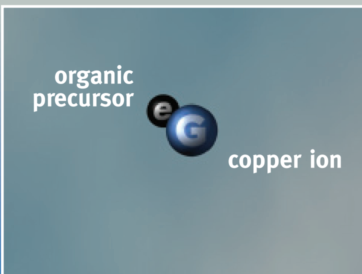
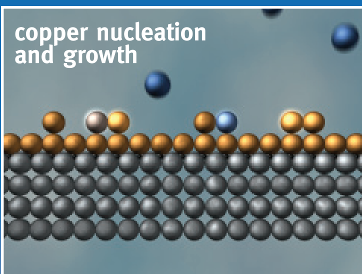
Electrografting: Alchimer's Revolutionary Wet Technology

eG Seed™ provides conformal, ultra-thin, uniform and adherent copper seed layers for the metallization of Advanced Interconnects.



Electrografting (*e*G™) is Alchimer's breakthrough proprietary technology, an electrochemical process based upon specific organic precursors enabling the nucleation and growth of nanometric films on conducting and semi-conducting surfaces.

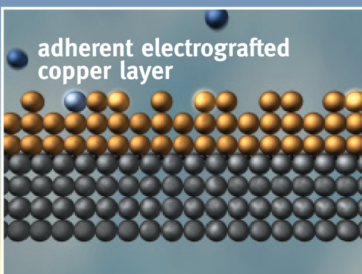
*e*G Seed™ belongs to the *e*G™ product family and is specifically designed for electrochemical deposition of copper seed layers used for the metallization of high aspect ratio dual damascene structures.

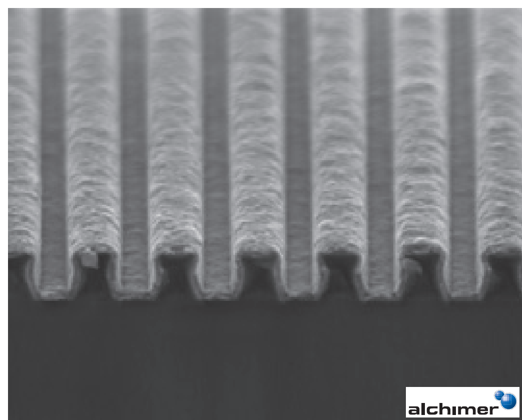


Ultra-thin (5 nm) and conformal copper seed layers can be deposited on various barrier materials with very high adhesion and low resistivity.

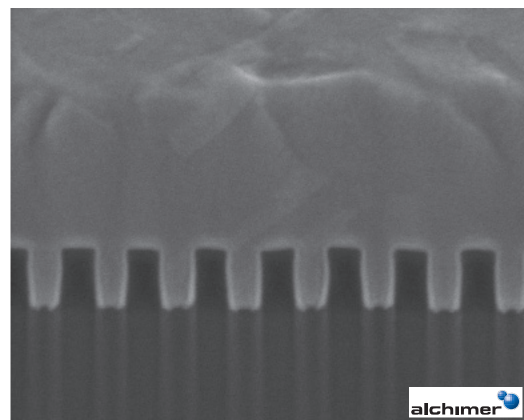
A unique benefit of *e*G Seed™ over PVD is its outstanding coverage of dual damascene structures, for higher yield and enhanced reliability.

_e_G Seed™ is a ready-to-use ultra-pure aqueous copper-based electrolyte solution. This wet copper seeding technology can be implemented onto any electroplating equipment and provides cost-effectiveness compared to high-cost vapor phase deposition techniques.





Conformal *e*G Seed over Advanced Interconnect trenches



Void-free gap fill of 45nm node trenches seeded with *e*G Seed

www.alchimer.com

FEATURES

- Ultra-conformal copper seed layers even at high aspect ratios
- Significant coverage advantage over PVD
- Highly adherent and low-resistivity ultra-pure copper films
- Uniformity at the wafer scale
- Nanometer scale thickness control
- High throughput
- Compatible with all electroplating equipments, standard blend waste stream and on-line monitoring systems

BENEFITS

- Lower Cost of Ownership compared to PVD
- Larger electroplating fill process window
- Higher yield and enhanced reliability
- Leveraging of legacy electroplating tools
- Reduced initial investment
- Improved return on investment (ROI)

MAIN CHARACTERISTICS OF *e*G Seed Cu SEED LAYERS

Properties	Typical Value
Layer thickness	5 to 50nm
Resistivity	10µOhm.cm @ 10nm
Adhesion	> 25 J/m² by 4-pt bending
Reliability (Stress and Electromigration)	Equivalent to reference
Device generation	45 nm node and beyond
Step coverage	> 90% (4:1 Aspect Ratio)
Uniformity	< 5% 3σ
Barrier compatibility	PVD, CVD, ALD Ta, TaN, Ti, TiN, TiW, W, Ru
ECD gap-fill compatibility	Void free
CMP compatibility	Equivalent to PVD Cu
EHS	Compliance to EHS standard
Chemistry Shelf life	6 months
In-line Monitoring	pH, conductivity, copper, organics
Tool compatibility	Compatible with all electroplating tools

ALCHIMER

Alchimer S.A. is a nanometric films company specializing in innovative chemistries, processes and IP for the electrochemical deposition of thin films based on its proprietary technology, Electrografting. The company is also specialized in the functionalization of conducting and semi-conducting surfaces. Alchimer is a spin-off from the Commissariat à l'Energie Atomique (CEA-Saclay, France).

www.alchimer.com