



MOMENTIVE

performance materials

Q Coat® Flash Evaporators

Q Coat PBN/Graphite Flash Evaporators from Momentive Performance Materials represent an advanced material solution for the flash metallization market. They are produced by coating a graphite resistive element with a layer of ultra-high purity pyrolytic boron nitride (PBN) by chemical vapor deposition (CVD).

Q Coat PBN/Graphite Flash Evaporators are engineered to be more electrically consistent and chemically stable for aluminum evaporation compared to traditional ceramic evaporators. Since PBN maintains its high electrical resistivity and resistance to corrosive attack by aluminum even at extreme temperatures, the aluminum remains completely isolated from the control circuit and the resulting power curve is stable and repeatable. Q Coat PBN/Graphite evaporators are also designed to directly substitute for ceramic evaporators in existing equipment.

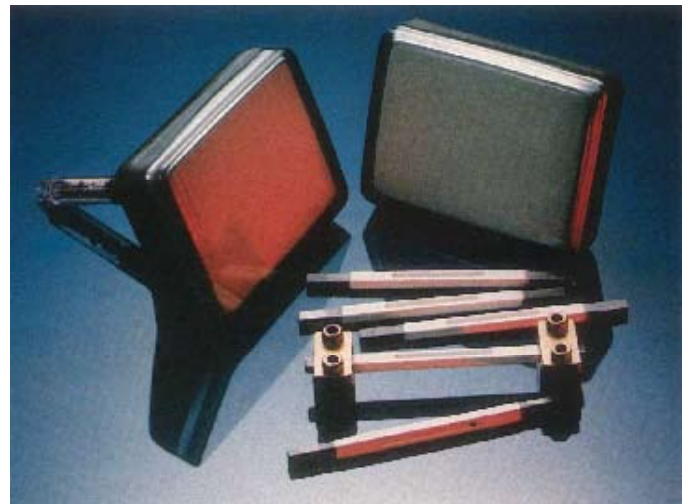
Performance Features

- Ultra pure
- Fully-dense ceramic - no outgassing
- Repeatable power curve
- Very long life (thousands of flashes)
- Direct substitute for ceramic elements
- Less downtime for maintenance/replacement
- Reduces rework due to improved consistency
- More consistent Al quality and thickness

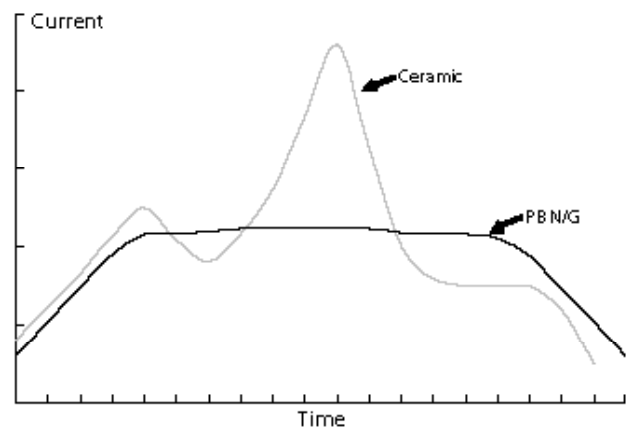
These features combine to make PBN/Graphite Flash Evaporators a cost-effective solution to metallization needs.

Control Stability

Since the aluminum charge is insulated from the electrical circuit with PBN/Graphite evaporators, there are no current spikes or resistance excursions, the result is a flat and consistent current demand - cycle after cycle.



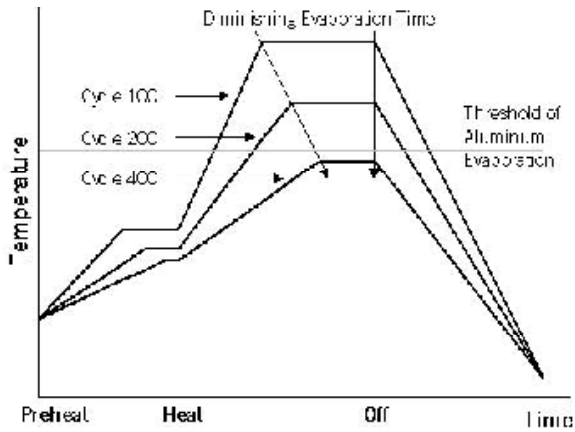
Evaporation Cycle



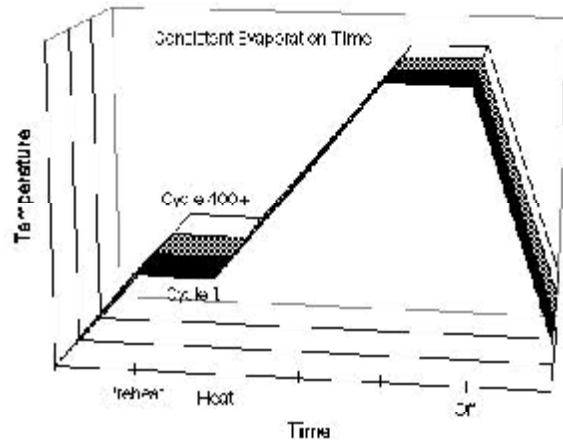
Process Stability

Chemical isolation and electrical insulation of the aluminum from the graphite resistive element for PBN/Graphite evaporators permit electrical resistance stability and consistency throughout their long life. This results in flash-to-flash temperature repeatability, with total aluminum evaporation and thickness (Q-value) consistency for the deposited layer.

Aging of Ceramic Evaporator



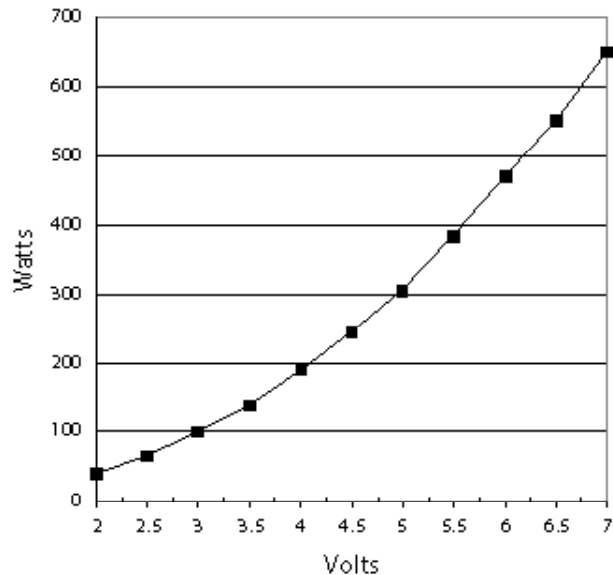
Aging of PBN/Graphite Evaporator



Typical Properties

Property	Graphite Substrate	PBN Barrier
Density	1.75 g/cc	2.15 g/cc
Permeability	1.3 in ² /sec	2.0 x 10 ⁻¹¹ in ² /sec II c
Modulus of Elasticity	10.3 GPa 1.5 x 10 ⁶ psi	20.6 GPa 3.0 x 10 ⁶ psi
Flexural Strength	30.0 MPa 4350 psi	82.8 MPa 12000 psi II a
CTE to 1100° C to 2000° F	3.9 x 10 ⁻⁶ /° C 7.0 x 10 ⁻⁶ /° F	2.6 x 10 ⁻⁶ /° C 4.7 x 10 ⁻⁶ /° F II a
Specific Heat	0.30 cal/gm-C 0.30 BTU/lb-F	0.24 cal/gm-C 0.24 BTU/lb-F
Thermal Conductivity (RT)	0.24 cal/sec-cm-C	0.15 cal/sec-cm-C
Spec. Resistance RT 1500° C	1.3 x 10 ⁻⁶ ohm-cm 0.6 x 10 ⁻⁶ ohm-cm	10 ¹⁵ ohm-cm 10 ⁶ ohm-cm

Typical Power Curve for PBN/Graphite



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