Materials and Incompatibilities

Materials used in AVS hot zones.

Graphite - Temperature limits for behavior in various atmospheric conditions or when in direct contact with some materials, usually leading to eutectic melting, such as tungsten, molybdenum or titanium

Atmosphere	Temperature	Result
High Vacuum	>2000°C	Sublimation
Millitorr range	>2200°C	Sublimation
Torr range	to 3000°C	OK
Air or Oxygen	>400°C	Oxidation
Water Vapor	700 - 750°C	Oxidation
Carbon Dioxide	800 - 900°C	Oxidation
Hydrogen	1000 - 1200°C	Methanidation
Nitrogen	2000 - 2500°C	Cyanidation
Chlorine	>2500°C	Sublimation
Argon	>3000°C	Sublimation

Molybdenum - Temperature limits for behavior in various atmospheric conditions or when in direct contact with some materials

Atmosphere	Temperature	Result
High Vacuum	>1600°C	Sublimation
Millitorr range	>1650°C	Sublimation
Torr range	to 1700°C	OK
Air or Oxygen	>400°C	Oxidation
Water Vapor	depends on %	Oxidation
Carbon Dioxide	>1200°C	Oxidation
Hydrogen	to 1700°C	OK
Nitrogen	to 1700°C	OK
Argon	to 1700°C	OK
Hydrocarbons	>1100°C	forms carbide
When in Direct Contact with…		
Graphite	>1100°C	forms carbide
Silicon	>1000°C	forms silicide

Tungsten - Temperature limits for behavior in various atmospheric conditions or when in direct contact with some materials air, carbon or graphite above 1700°C

Atmosphere	Temperature	Result
High Vacuum	>2000°C	Sublimation
Millitorr range	>2100°C	Sublimation
Torr range	to 2200°C	OK
Air or Oxygen	>400°C	Oxidation
Water Vapor	>600°C	Oxidation
Carbon Dioxide	>1200°C	Oxidation
Hydrogen	to 2200°C	OK
Nitrogen	to 2200°C	OK
Argon	to 2200°C	OK
Hydrocarbons	>1400°C	forms carbide
When in Direct Contact with…		
Graphite	>1400°C	forms carbide

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