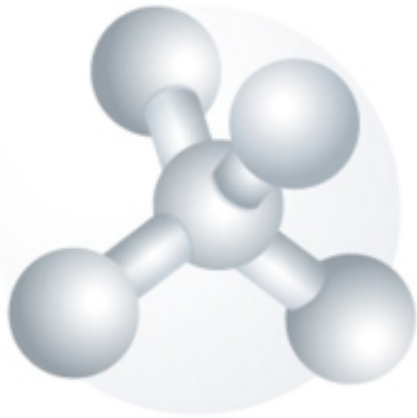


# ALOHA™ Special Precursors



## CHORUS

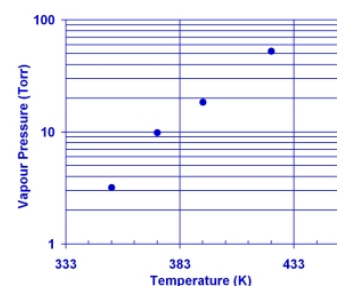
High Volatility Ruthenium Precursor for Pure Ruthenium Chemical Vapor Deposition

CAS n° : confidential

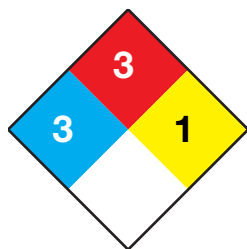
- Ruthenium is used as an electrode material over high-k dielectric capacitors in MIM structure. It is also envisaged as a metal gate material in 45 nm and below devices, and in BEOL as a direct adhesion and seed layer for electroplating.
- CHORUS™ has been designed to yield high purity, pinhole-free Ru films with low resistivity, low impurity incorporation, even at very low thicknesses.
- CHORUS™ can be used with a variety of co-reactants such as H<sub>2</sub> or NH<sub>3</sub>. As opposed to many organometallic Ru compounds, CHORUS™ does not require the usage of O<sub>2</sub> as a co-reactant. As a result, films with extremely low O content can be obtained (< 1.E+19 at.cm<sup>-3</sup>).
- Chemical vapor deposition evaluation has shown that CHORUS™ exhibits no incubation time for better thickness control.
- In addition, CHORUS™ has the highest volatility among the usual Ru precursors, allowing high deposition rate and throughput.
- Like for most of the ALOHA advanced products, each canister of CHORUS™ is supplied with a BALAZS CofA and meets stringent purity requirements. Please consult [www.balazs.com](http://www.balazs.com) for more information on Air Liquide's BALAZS analytical services.

### Physical Chemical Properties

Properties	
Molecular Weight	Confidential
Physical State	Liquid
Colour	Pale yellow
Melting Point	< -50°C
Vapour Pressure	7.5 torr @ 100°C
Viscosity	8.5 cP @ 24 °C
Liquid Density	1.36 g.cm-3



## Hazard Rating

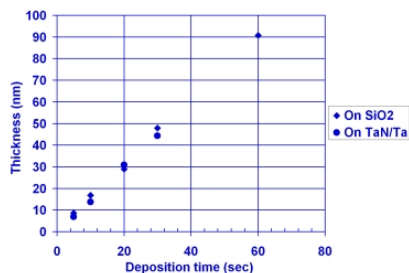


### HMIS

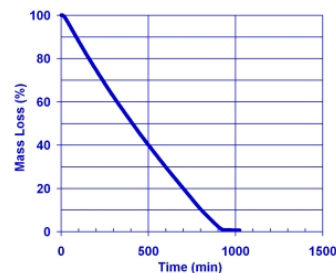
Health: 3  
Flammability: 3  
Reactivity: 1

- Please consult ALOHA for detailed material compatibility recommendation.

## CHORUS Performances



- Left : Deposition data  
CHORUS exhibits no incubation time either on TaN/Ta substrate or on SiO<sub>2</sub> substrate by Chemical Vapour Deposition.
- Right : Isothermal TGA data  
CHORUS shows fast evaporation kinetics even at 80°C and virtually no residue.



## Packaging & Dispensing System

- CHORUS can be packaged in a variety of canisters depending on the application.
- For on-board applications, CHORUS is usually supplied in 1200 or 1800 ml canisters with various valving and dip-tube configurations. Multipoint or continuous level sensing systems can also be customized to meet each specific requirements.
- ALOHA's on-board canisters have all-metal construction and are cleaned and dried by state of the art techniques. CHORUS can also be filled in properly documented customer-supplied canisters.
- Smaller R&D level packages are available as well for basic research needs.



## Transport Information

- Proper shipping name: Confidential
- UN Number: 1993
- Class/division: 3 (Flammable)
- Packing group: II
- DOT Hazard Class : Class 3 (Flammable)

