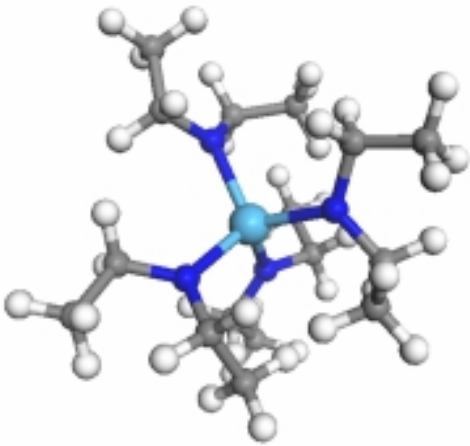


ALOHA™ CVD/ALD Materials



TDEAHf

Tetrakis[DiEthylAmino]Hafnium

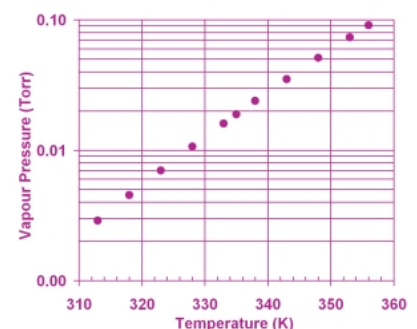
$\text{Hf}[\text{N}(\text{C}_2\text{H}_5)_2]_4$

CAS n° 19962-12-0

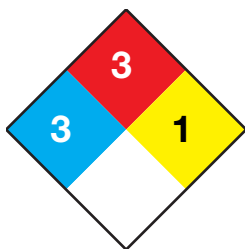
- TDEAHf is used essentially for the deposition of pure HfO_2 or as a mixed oxide of other elements such as Silicon, Aluminum, Zirconium, Titanium, Tantalum, or others (for Si and Al mixed oxides, ALOHA has developed a set of precursors - TDEAA, SAM.24 and TSA - that have an optimized process window overlap with TDEAHf).
- TDEAHf can be used both in ALD or MOCVD mode for the deposition of high-k films, with O_2 , O_3 and H_2O being the most common co-reactants.
- TDEAHf is a clear liquid that reacts immediately upon contact with water or moisture (white fumes in air), with the evolution of diethylamine. It is also the least volatile of the usual Hafnium CVD/ALD precursors.
- Like for most of the ALOHA advanced products, each canister of TDEAHf is supplied with a BALAZS CofA ensuring strict compliance with the specifications. Please consult www.balazs.com for more information on Air Liquide's BALAZS analytical services.
- Beside semiconductor application, high purity Hafnium is used in the nuclear industry for control rods. Lower purity material is used for alloying and gettering applications. Hafnium is essentially a "by-product" of Zirconium purification.

Physical Chemical Properties

Physical Property	
Molecular Weight	467 g.mol ⁻¹
Physical State	Liquid
Colour	Colourless
Melting Point	< -20°C
Vapour Pressure	~ 0.1 Torr @ 85°C
Specific Gravity	1.249 g.cm ⁻³



Hazard Rating



HMIS

Health: 3
Flammability: 3
Reactivity: 1

The product should be handled considering that the major by-product in case of air exposure is diethylamine. Please consult the ALOHA MSDS of TDEAHf for additional data.

All materials in contact with TDEAHf should be compatible within amines. Please consult ALOHA for detailed materials recommendation.

Packaging & Dispensing System

- TDEAHf can be packaged in a variety of canisters depending on the application.
- For on-board applications, TDEAHf is usually supplied in 1200, 1800 or 2500 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. TDEAHf can also be filled in properly documented customer-supplied canisters.
- Since TDEAHf has a very low vapour pressure at room temperature, the solvent purge option for the Air Liquide CANDI system is mandatory. ALOHA's UHP Hexane or Octane undergo a proprietary drying process for this application. For the cleaning of on-board manifold and direct exhaust to the tool, a new and harmless high volatility solvent can be proposed.



Transport Information

- Proper shipping name: Organometallic substance, water reactive, flammable, n.o.s. (Tetrakis(diethylamino) Hafnium)
- CAS n° 19824-55-6 / 19962-12-0
- UN Number: 3399
- Class/division: 4.3
- Package group: II
- Hazard Labels required : Class 4.3 (Dangerous When Wet), Class 3 (Flammable)

