

UltraPur™ 4MS

Tetramethylsilane

Tetramethylsilane (4MS) is an important precursor used in the chemical vapor deposition (CVD) of low- κ inter-metal dielectric films (IMDs) for sub-0.25 μm IC interconnects. Nominally one micron thick films with dielectric constants (κ values) of about 2.8 can be prepared with 4MS, which is a highly promising candidate to implementation in low- κ film processes and related Si-C liners. Entegris offers 4MS in the highest purity available to the industry which serves to minimize key film performance variables.

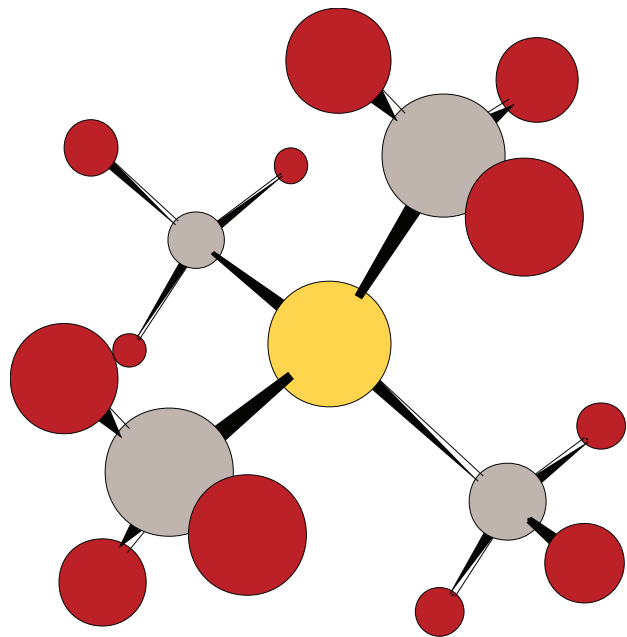
Entegris offers 4MS in a semiconductor grade. The material is proprietary and packaged using techniques specifically developed by Entegris. A certificate of analysis will be provided with each 4MS order detailing the results of a comprehensive analysis including trace metals, water, chloride and GC analysis.

Entegris is the semiconductor industry's innovator of liquid chemical delivery systems for 4MS. We provide development-stage, pre-production and fab-wide 4MS liquid delivery systems.

Entegris is a leading industry supplier that provides a complete line of advanced materials, delivery systems and control/monitoring systems which enable comprehensive material lifecycle management solutions for OEMs and end users.

FEATURES & BENEFITS

- Semiconductor grade
- Robust delivery system
- Reliable material supply
- On-board ampoule refillable technology
- Research and development support for materials compatibility
- Standard shelf life of 12 months



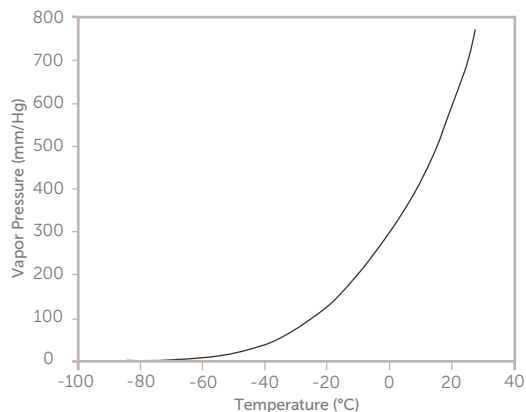
● Carbon ● Oxygen ● Silicon

APPLICATIONS

- Precursor for OSG by PECVD
- Precursor for $\text{Si}_x\text{C}_y\text{N}_z$ deposition

PERFORMANCE DATA

Vapor Pressure Curve



SPECIFICATIONS

Physical properties

Chemical formula	(CH ₃) ₄ Si
Molecular weight	88.22
Specific gravity	0.65
Boiling point	26.7°C (80.06°F) @ 0.1 mm Hg
Melting point	-99°C (-146.2°F)
Flash point (closed cup)	-27°C (-16.6°F)

Purity analysis

Element	Detection limit	Specification	Analytical method
Aluminum	0.012 ppb	0.200 ppb	ICP-MS
Antimony	0.018 ppb	0.500 ppb	ICP-MS
Arsenic	0.018 ppb	0.500 ppb	ICP-MS
Barium	0.003 ppb	0.500 ppb	ICP-MS
Beryllium	0.005 ppb	0.500 ppb	ICP-MS
Bismuth	0.004 ppb	0.500 ppb	ICP-MS
Boron	0.334 ppb	5.000 ppb	ICP-MS
Cadmium	0.005 ppb	0.500 ppb	ICP-MS
Calcium	0.043 ppb	10.000 ppb	ICP-MS
Chromium	0.007 ppb	0.500 ppb	ICP-MS
Cobalt	0.005 ppb	0.500 ppb	ICP-MS
Copper	0.008 ppb	0.500 ppb	ICP-MS
Gallium	0.004 ppb	0.500 ppb	ICP-MS
Germanium	0.010 ppb	0.500 ppb	ICP-MS
Gold	0.006 ppb	0.500 ppb	ICP-MS

Purity analysis (continued)

Element	Detection limit	Specification	Analytical method
Iron	0.014 ppb	5.000 ppb	ICP-MS
Lead	0.004 ppb	0.500 ppb	ICP-MS
Lithium	0.006 ppb	0.500 ppb	ICP-MS
Magnesium	0.005 ppb	3.000 ppb	ICP-MS
Manganese	0.038 ppb	0.500 ppb	ICP-MS
Mercury	0.032 ppb	0.500 ppb	ICP-MS
Molybdenum	0.008 ppb	0.500 ppb	ICP-MS
Nickel	0.007 ppb	0.500 ppb	ICP-MS
Niobium	0.003 ppb	0.500 ppb	ICP-MS
Potassium	0.072 ppb	1.000 ppb	ICP-MS
Silver	0.013 ppb	0.500 ppb	ICP-MS
Sodium	0.032 ppb	2.000 ppb	ICP-MS
Strontium	0.004 ppb	0.500 ppb	ICP-MS
Tantalum	0.003 ppb	0.500 ppb	ICP-MS
Thallium	0.003 ppb	0.500 ppb	ICP-MS
Thorium	0.004 ppb	0.500 ppb	ICP-MS
Tin	0.033 ppb	0.500 ppb	ICP-MS
Titanium	0.015 ppb	0.500 ppb	ICP-MS
Uranium	0.004 ppb	0.500 ppb	ICP-MS
Vanadium	0.010 ppb	0.500 ppb	ICP-MS
Zinc	0.028 ppb	0.500 ppb	ICP-MS
Zirconium	0.004 ppb	0.500 ppb	ICP-MS

Purity analysis (continued)

Parameter	Detection limit	Specification	Analytical method
Assay	—	99.99%	GC
Chloride	—	1 ppm	Typical
Color	—	10	Typical
Purity	—	99.99999%	ICP-MS
Water	1.3 ppm	20 ppm	KF Titrator

FOR MORE INFORMATION

Please call your Regional Customer Service Center today to learn what Entegris can do for you. Visit entegris.com and select the Contact Us link to find the customer service center nearest you.

TERMS AND CONDITIONS OF SALE

All purchases are subject to Entegris' Terms and Conditions of Sale. To view and print this information, visit entegris.com and select the Terms and Conditions link in the footer.



Corporate Headquarters
129 Concord Road
Billerica, MA 01821
USA

Customer Service
Tel +1 952 556 4181
Fax +1 952 556 8022
Toll Free 800 394 4083

Entegris®, the Entegris Rings Design™, Pure Advantage™ and UltraPur™ are registered trademarks of Entegris, Inc.

©2016–2017 Entegris, Inc. | All rights reserved. | Printed in the USA | 7413-8054ENT-0717