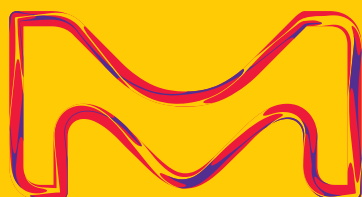


MERCK

Deposition & Semiconductor Materials

Enabling
State-of-the-Art Applications



The Life Science
business of Merck
operates as
MilliporeSigma in
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Sigma-Aldrich®
Lab & Production Materials

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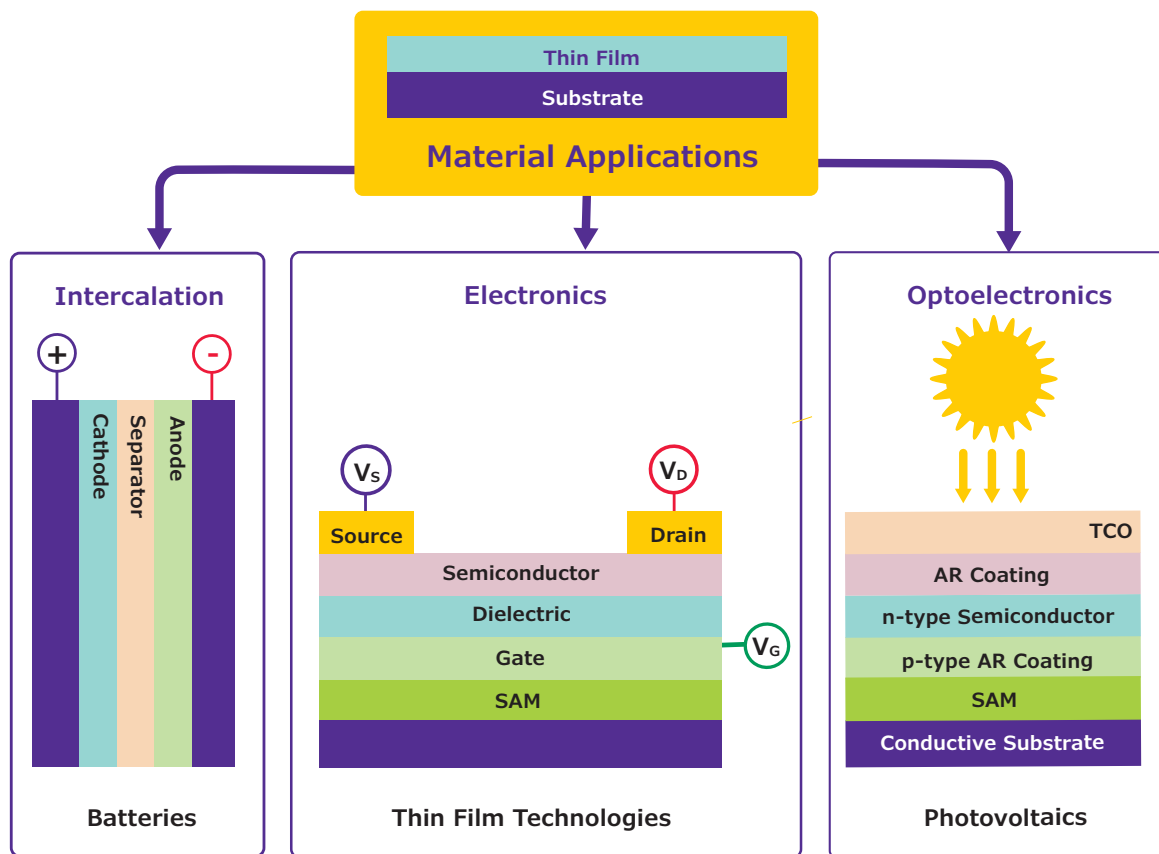
Enabling Cutting-Edge Technology with Deposition & Semiconductor Materials

Chemical solution deposition and chemical vapor deposition are two advanced methods utilized for producing precise thin solid films and coatings of high quality. These methods help to improve surface properties such as mechanical, electrical, and optical as compared to bulk materials. Semiconductor materials play a pivotal role in manufacturing various electronic components for next-generation electronic devices.

We offer a wide range of CVD, ALDs, PLD, and semiconductor materials.

Explore our broad range of high-quality and dependable thin film deposition precursor and semiconductor materials as per your chosen method and application. visit SigmaAldrich.com/deposition

Thin Film Technologies



Solution Deposition Precursors

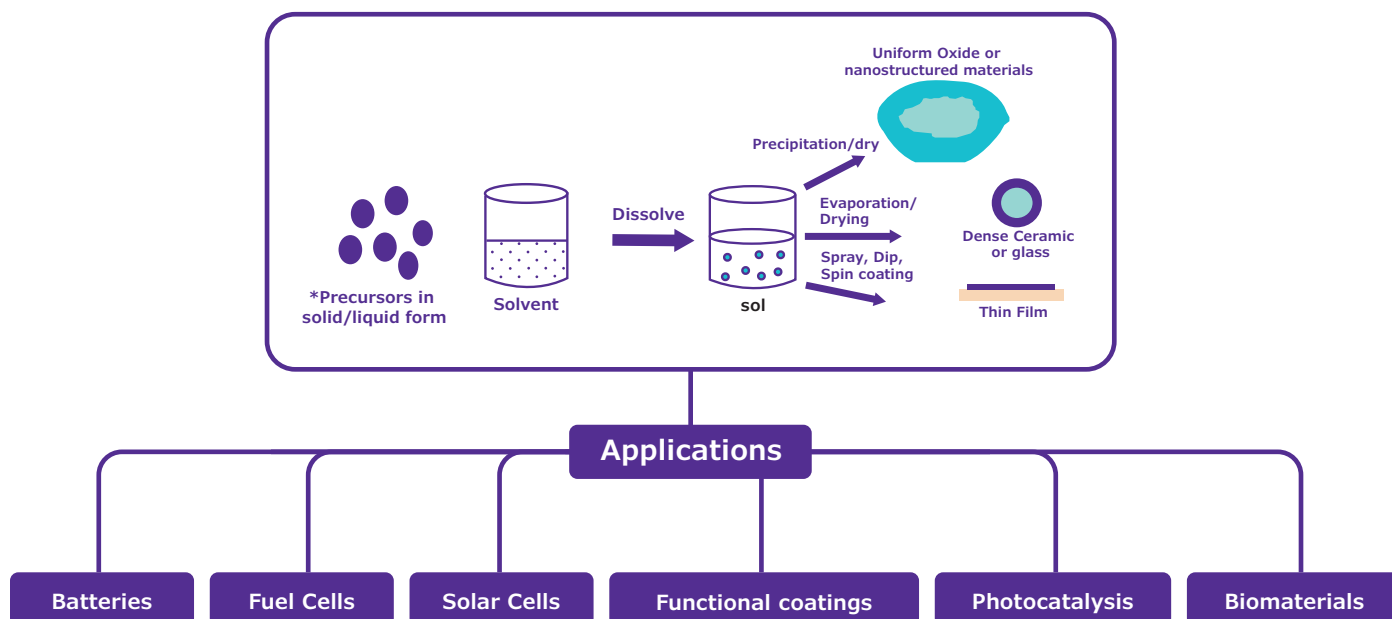
The use of solution deposition precursors has expanded to encompass a wide variety of chemical processes. In fact, it is now more broadly characterized as encompassing the creation of solid materials, including metal oxides, from precursor solutions.

Purity is crucial for sol-gel precursors because any impurities can significantly alter the resulting material's properties. Contaminants can affect the chemical reactivity, phase composition, and microstructure of the final product. Additionally, impurities can lead to the formation of unwanted by-products, affecting the material's purity and performance. Therefore, maintaining high purity in sol-gel precursors is essential to ensuring the desired characteristics and functionality of the resulting materials.

We provides 55 different base metals with:

- ultra-high trace metals purity from 99.9% to 99.999% to ensure the exceptional performance as per research need
- various functionalities, such as acetate, acetylacetonate, tert-butoxide, isopropoxide, phenoxide, ethoxide, tri-sec-butoxide, methoxide, and 2-ethylhexanoate
- consistent quality with detailed specifications for particular applications
- readily soluble in a suitable solvent to form a homogeneous solution for the sol-gel process
- stable under the sol-gel processing conditions to prevent premature gelation or unwanted side reactions

For a complete list of our deposition precursors, visit [SigmaAldrich.com/deposition](https://sigmaaldrich.com/deposition)



Name	Molecular formula	Purity	Form	CAS No.	Cat. No.
Aluminum isopropoxide	Al[OCH(CH ₃) ₂] ₃	≥99.99% trace metals basis	Solid	555-31-7	229407
		≥98%			220418
Aluminum silicate	3Al ₂ O ₃ · 2SiO ₂	NA	Solid	12141-46-7	520179
Diethylaluminum ethoxide	(C ₂ H ₅) ₂ AlOC ₂ H ₅	97%	Solid	1586-92-1	256749
Aluminum-tri-sec-butoxide	Al[OCH(CH ₃)C ₂ H ₅] ₃	97%	Liquid	2269-22-9	201073
Antimony(III) acetate	Sb(CH ₃ CO ₂) ₃	99.99% trace metals basis	Solid	6923-52-0	483265
Antimony(III) ethoxide	Sb(OC ₂ H ₅) ₃	Sb, 46.6-48.1% iodometric	Liquid	10433-06-4	213314
Barium nitrate	Ba(NO ₃) ₂	99.999% trace metals basis	Solid	10022-31-8	202754
Barium acetate	Ba(CH ₃ COO) ₂	99.999% trace metals basis	Solid	543-80-6	255912
Cadmium(II) acetate	Cd(OCOCH ₃) ₂	anhydrous, 99.995%	Solid	543-90-8	755087
Cadmium acetate hydrate	Cd(CH ₃ CO ₂) ₂ · xH ₂ O	≥99.99% trace metals basis	Solid	89759-80-8	229490
Calcium methoxide	Ca(OCH ₃) ₂	97%	Solid	2556-53-8	445568
Cerium(III) acetate hydrate	Ce(CH ₃ CO ₂) ₃ · xH ₂ O	99.99% trace metals basis	Solid	206996-60-3	529559
Cobalt(II) acetate	Co(CH ₃ CO ₂) ₂	99.99% trace metals basis	Solid	71-48-7	399973
Cobalt(II) 2-ethylhexanoate solution	Co[CH ₃ (CH ₂) ₃ CH(C ₂ H ₅)CO ₂] ₂	65 wt. % in mineral spirits	Liquid	136-52-7	444545
Copper(II) acetate	Cu(CO ₂ CH ₃) ₂	powder, 99.99% trace metals basis	Solid	142-71-2	517453
Copper(II) acetate monohydrate	Cu(CO ₂ CH ₃) ₂ · H ₂ O	99.99% trace metals basis	Solid	6046-93-1	229601
Dysprosium(III) acetate hydrate	(CH ₃ CO ₂) ₃ Dy · 4H ₂ O	99.9% trace metals basis	Solid	15280-55-4	325538
Ethyl acetoacetate sodium salt	CH ₃ C(ONa)=CHCO ₂ C ₂ H ₅	NA	Solid	20412-62-8	164100
Erbium(III) acetate hydrate	Er(CH ₃ CO ₂) ₃ · xH ₂ O	99.9% trace metals basis	Solid	207234-04-6	325570
Europium(III) acetate hydrate	Eu(CH ₃ CO ₂) ₃ · xH ₂ O	99.999% trace metals basis	Solid	62667-64-5	545090
		99.9% trace metals basis			325627
Gadolinium(III) acetate hydrate	Gd(CH ₃ CO ₂) ₃ · xH ₂ O	99.9% trace metals basis	Solid	100587-93-7	325678
Germanium(IV) ethoxide	Ge(OC ₂ H ₅) ₄	≥99.95% trace metals basis	Liquid	14165-55-0	339180
Hafnium(IV) tert-butoxide	Hf[OC(CH ₃) ₃] ₄	99.99% trace metals basis (purity excludes ~2000 ppm zirconium.)	Liquid	2172-02-03	445541
Hafnium(IV) n-butoxide	HfC ₁₆ H ₃₆ O ₄	-	Liquid	22411-22-9	667943
Holmium(III) acetate hydrate	Ho(CH ₃ CO ₂) ₃ · xH ₂ O	99.99% trace metals basis	Solid	312619-49-1	467332
Indium(III) acetate	In(C ₂ H ₃ O ₂) ₃	99.99% trace metals basis	Solid	25114-58-3	510270
Iron(II) acetate	Fe(CO ₂ CH ₃) ₂	≥99.99% trace metals basis	Solid	3094-87-9	517933
Lanthanum(III) acetate hydrate	La(CH ₃ CO ₂) ₃ · xH ₂ O	99.9% trace rare earth metals basis	Solid	100587-90-4	306339
Lead(II) acetate trihydrate	Pb(CH ₃ CO ₂) ₂ · 3H ₂ O	99.999% trace metals basis	Solid	6080-56-4	316512
Lithium acetate	LiOOCCH ₃	99.95% trace metals basis	Solid	546-89-4	517992
Lithium acetate	LiOOCCH ₃	anhydrous, 99.9% trace metals basis	Solid	546-89-4	920320
Lutetium(III) acetate hydrate	Lu(CH ₃ CO ₂) ₃ · xH ₂ O	99.9% trace metals basis	Solid	207500-05-8	325783
Magnesium ethoxide	Mg(OC ₂ H ₅) ₂	98%	Solid	2414-98-4	291846
Manganese(II) acetate tetrahydrate	Mn(CH ₃ COO) ₂ · 4H ₂ O	≥99%	Solid	6156-78-1	221007
		99.99% trace metals basis			229776
Nickel(II) acetate tetrahydrate	Ni(OCOCH ₃) ₂ · 4H ₂ O	99.995% trace metals basis	Solid	6018-89-9	379883
		98%			244066
Niobium(V) ethoxide	Nb(OCH ₂ CH ₃) ₅	99.95% trace metals basis	Liquid	3236-82-6	339202
Palladium(II) acetate	Pd(OCOCH ₃) ₂	99.98% trace metals basis	Solid	3375-31-3	379875
Palladium(II) propionate	Pd(C ₂ H ₃ CO ₂) ₂	≥99.9% trace metals basis	Solid	3386-65-0	481165
Potassium tert-butoxide solution	(CH ₃) ₃ COK	1.0 M in THF	Liquid	865-47-4	328650
Potassium acetate	CH ₃ COOK	99.98% trace metals basis	Solid	127-08-2	255785
Rhodium(II) acetate dimer	Rh ₂ (OOCCH ₃) ₄	99.9% trace metals basis	Solid	15956-28-2	482285
Samarium(III) acetate hydrate	(CH ₃ CO ₂) ₃ Sm · xH ₂ O	99.9% trace metals basis	Solid	100587-91-5	325872

Name	Molecular formula	Purity	Form	CAS No.	Cat. No.
Scandium(III) acetate hydrate	$(\text{CH}_3\text{CO}_2)_3\text{Sc} \cdot x\text{H}_2\text{O}$	99.9% trace metals basis	Solid	304675-64-7	325899
Silver acetate	CH_3COOAg	99.99% trace metals basis	Solid	563-63-3	204374
Silver trifluoroacetate	CF_3COOAg	98%	Solid	2966-50-9	T62405
Sodium thiomethoxide	CH_3SNa	95%	Solid	5188-07-08	281018
Sodium acetate	CH_3COONa	99.995% trace metals basis	Solid	127-09-3	229873
Strontium isopropoxide	$\text{Sr}(\text{OCH}(\text{CH}_3)_2)_2$	99.9% trace metals basis	Solid	88863-33-6	440698
Tantalum(V) ethoxide	$\text{Ta}(\text{OC}_2\text{H}_5)_5$	99.98% trace metals basis	Solid	6074-84-6	339113
Tantalum(V) butoxide	$\text{Ta}(\text{OCH}_2\text{CH}_2\text{CH}_2\text{CH}_3)_5$	99.99% trace metals basis	Liquid	51094-78-1	383333
Terbium(III) acetate hydrate	$\text{Tb}(\text{CH}_3\text{CO}_2)_3 \cdot x\text{H}_2\text{O}$	99.9% trace metals basis	Solid	100587-92-6	325929
Thallium(I) acetate	CH_3COOTl	≥99%	Solid	563-68-8	T8266
Thallium(I) nitrate	TlNO_3	99.999% trace metals basis	Solid	10102-45-1	204609
Tin(IV) acetate	$\text{Sn}(\text{CH}_3\text{CO}_2)_4$	Sn, 31.4-35.5% gravimetric	Solid	2800-96-6	345172
Tin(IV) tert-butoxide	$\text{Sn}(\text{OC}(\text{CH}_3)_3)_4$	≥99.99% trace metals basis	low-melting solid	36809-75-3	494135
Titanium(IV) isopropoxide	$\text{Ti}[\text{OCH}(\text{CH}_3)_2]_4$	99.999% trace metals basis	Liquid	546-68-9	377996
Titanium(IV) butoxide	$\text{Ti}(\text{OCH}_2\text{CH}_2\text{CH}_2\text{CH}_3)_4$	reagent grade, 97%	Liquid	5593-70-4	244112
Vanadium(V) oxytriethoxide	$\text{OV}(\text{OC}_2\text{H}_5)_3$	95%	Liquid	1686-22-2	470775
Ytterbium(III) acetate tetrahydrate	$\text{Yb}(\text{C}_2\text{H}_3\text{O}_2)_3 \cdot 4\text{H}_2\text{O}$	99.9% trace metals basis	Solid	15280-58-7	326011
Yttrium(III) acetate hydrate	$\text{Y}(\text{CH}_3\text{CO}_2)_3 \cdot x\text{H}_2\text{O}$	99.9% metals basis	Solid	304675-69-2	326046
Yttrium(III) butoxide solution	$\text{Y}(\text{OC}_4\text{H}_9)_3$	0.5 M in toluene, ≥99.9% trace metals basis	Liquid	111941-71-0	510661
Zinc acetate dihydrate	$\text{Zn}(\text{CH}_3\text{COO})_2 \cdot 2\text{H}_2\text{O}$	99.999% trace metals basis	Solid	5970-45-6	379786
Zirconium(IV) ethoxide	$\text{Zr}(\text{OC}_2\text{H}_5)_4$	97%	Solid	18267-08-8	339121
Zirconium(IV) butoxide solution	$\text{Zr}(\text{OC}_4\text{H}_9)_4$	80 wt. % in 1-butanol	Liquid	1071-76-7	333948

Physical Vapor Deposition (PVD)

Name	Molecular formula	Purity	diam. × L	CAS No.	Cat. No.
Silver	Ag	99.99%	0.6 cm × 1.2 cm	7440-22-4	373249
Iridium	Ir	99.9%	0.6 cm × 1.2 cm	7439-88-5	373249
Palladium	Pd	99.95%	0.6 cm × 0.6 cm	7440-05-3	373206
Gold	Au	99.99%	0.635 cm × 0.635 cm	7440-57-5	373168
		99.99%	0.3 cm × 0.6 cm		373184
Aluminum	Al	99.999%	6.3 mm × 6.3 mm	7429-90-5	433705
Titanium	Ti	99.99%	6.3 mm × 6.3 mm	7440-32-6	433667
Platinum	Pt	99.99%	0.6 cm × 1.2 cm	7440-06-4	373214

Chemical Vapor Deposition(CVD) & Atomic Layer Deposition(ALD) Precursors

The ALD and CVD precursors, play a vital role in producing nanometer-thin layers of metals, semiconductors, and insulating materials. These essential materials are used in advanced electronics, efficient solar panels, memory devices, computer chips, and a wide range of high-performance tools.

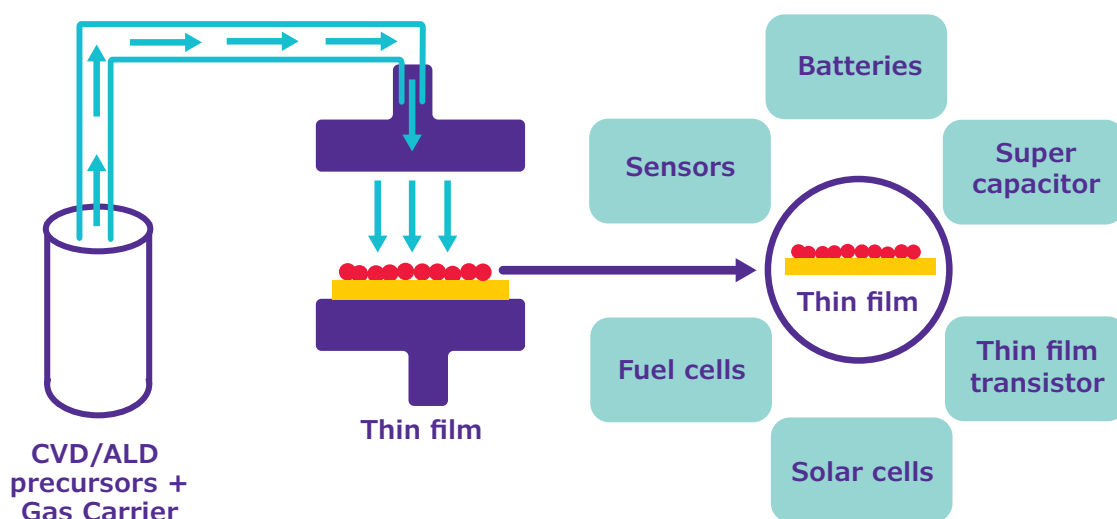
It is important for the researchers to have high purity, uniformity, and chemical composition. When selecting precursors for chemical vapor deposition (CVD) and atomic layer deposition (ALD) processes to create thin films, it's crucial to consider the purity, volatility, thermal stability and reactivity with the substrate surface. We offer high purity (99% to 99.999% trace metals basis) precursors to prevent impurities from affecting film properties. Furthermore, our precursors are thermally stable at deposition temperatures and has reactivity with the substrate surface for effective film deposition. Ultimately, these material properties will enable you to achieve precise and high-quality thin films for your specific research and application needs.

We offer a wide selection of Chemical Vapor Deposition (CVD) and atomic layer Deposition(ALD) material available in

- Metal halides
- Metal alkyls
- Metal β -diketonates
- Metal Carbonyls
- Silanes & Silanols
- Silicates
- Metallocenes
- Metal Alkylamides

For a complete list of our deposition precursors, visit

[SigmaAldrich.com/solution-and-vapor-deposition-precursors](https://sigmaaldrich.com/solution-and-vapor-deposition-precursors)



Name	Molecular formula	Purity /Description	Form	Thermal Behaviour	CAS No.	Cat. No.
Metal Halides						
Aluminum chloride	AlCl ₃	anhydrous, powder, 99.999% trace metals basis	Solid	Melting point: 190 °C (lit.)	7446-70-0	563919
Aluminum bromide	AlBr ₃	anhydrous, powder, 99.999% trace metals basis	Solid	Melting point: 94-98 °C (lit.)	7727-15-3	449601
Antimony(V) chloride	SbBr ₅	≥99.99% trace metals basis"	Liquid	Boiling point: 92 °C/30 mmHg (lit.), Melting point: 2.8 °C (lit.)	7647-18-9	338877

Name	Molecular formula	Purity /Description	Form	Thermal Behaviour	CAS No.	Cat. No.
Boron trifluoride	BF ₃	electronic grade, ≥99.99%	Gas	Melting point: –127 °C (lit.), Boilint point: –100 °C (lit.)	7637-07-02	463086
Bismuth(III) chloride	BiCl ₃	anhydrous, powder, 99.998% trace metals basis	Solid	Melting point: 230-232 °C (lit.), Boilint point: 447 °C (lit.)	7787-60-2	450723
Cerium(III) chloride	CeCl ₃	AnhydroBeads™, –10 mesh, ≥99.99% trace metals basis	Beads	Melting point: 848 °C (lit.)	7790-86-5	429406
Dysprosium(III) chloride	DyCl ₃	anhydrous, powder, 99.99% trace metals basis"	Powder	Melting point:680 °C (lit.)	10025-74-8	325546
Europium(III) chloride	EuCl ₃	anhydrous, powder, 99.99% trace metals basis	Powder	Melting point: 850 °C (lit.)	10025-76-0	429732
Gadolinium(III) chloride	GdCl ₃	anhydrous, powder, 99.99% trace metals basis	Solid		10138-52-0	439770
Hafnium(IV) chloride	HfCl ₄	purified by sublimation, 99.9% trace metals basis	Powder		13499-05-3	590592
Holmium(III) chloride	HoCl ₃	anhydrous, powder, 99.9% trace metals basis	Powder	Melting point: 718 °C (lit.)"	10138-62-2	450901
Indium(III) chloride	InCl ₃	anhydrous, powder, ≥99.999% trace metals basis	Powder		10025-82-8	429414
Molybdenum(V) chloride	MoCl ₅	anhydrous, powder, 99.99% trace metals basis (excluding W)	Powder		10241-05-1	642452
Neodymium(III) chloride	NdCl ₃	anhydrous, powder, ≥99.99% trace metals basis	Powder	Melting point:784 °C (lit.)	10024-93-8	449946
Niobium(V) chloride	NbCl ₅	anhydrous, powder, 99.995% trace metals basis	Powder	Melting point: 204.7 °C (lit.)	10026-12-7	510696
Praseodymium(III) chloride	PrCl ₃	anhydrous, powder, 99.99% trace metals basis	Powder	Melting point: 786 °C (lit.)	10361-79-2	298298
Silicon tetrabromide	SiBr ₄	99.995% trace metals basis	Liquid	Boiling point: 153 °C (lit.), Melting point: 5 °C (lit.)	7789-66-4	494100
Silicon tetrachloride	SiCl ₄	99.998% trace metals basis	Liquid	Boiling point: 57.6 °C (lit.), Melting point: -70 °C (lit.)	10026-04-7	289388
Tantalum(V) chloride	TaCl ₅	anhydrous, powder, 99.999% trace metals basis	Powder	Melting point: 217 °C (lit.)	7721-01-9	510688
Terbium(III) chloride	TbCl ₃	anhydrous, powder, 99.99% trace metals basis	Powder	Melting point: 588 °C (lit.)	10042-88-3	451304
Tungsten(VI) chloride	WCl ₆	≥99.9% trace metals basis	Powder	Boiling point: 347 °C (lit.), Melting point: 275 °C (lit.)	13283-01-7	241911
Yttrium(III) chloride	YCl ₃	anhydrous, powder, 99.99% trace metals basis	Powder	Melting point: 721 °C (lit.)	10361-92-9	451363
Zirconium(IV) chloride	ZrCl ₄	anhydrous, powder, 99.99% trace metals basis	Powder		10026-11-6	647640

Name	Synonyms/ Acronym	Purity / Description	Form	Thermal Behaviour	CAS No.	Cat. No.
Metal Alkyls						
Dimethyl selenide	Methyl selenide	≥99.0% (GC)	Liquid	Density: 1.408 g/mL at 20 °C (lit.)	593-79-3	41572
Hexamethyldigermanium(IV)	Me ₆ Ge ₂ / Digermane	technical grade	Liquid	Boiling point: 137-138 °C (lit.), Melting point: -40 °C (lit.)	993-52-2	447609
Tetraallyltin	Tetraallyl- stannane,	97%	Liquid	Boiling point: 69-70 °C/1.5 mmHg (lit.)	7393-43-3	271446
Tetramethylgermanium	Me ₄ Ge/ Germane	98%	Liquid	Boiling point: 43-44 °C/740 mmHg (lit.), melting point: -88 °C (lit.)	865-52-1	396354
Tetramethyltin	Stannane	95%	Solid	Boiling point: 74-75 °C (lit.) Melting point: -54 °C (lit.)	594-27-4	481394
Tetravinyltin	Etraethenyl- stannane	97%	Liquid	Boiling point: 160-163 °C (lit.)	1112-56-7	328669
Tributylgermanium hydride	Tributyl-germane	99%	Liquid	Boiling point: 123 °C/20 mmHg (lit.)	998-39-0	409170
Triethylgermanium hydride	Triethyl-germane	98%	Liquid	Boiling point: 121-122 °C/20 mmHg (lit.)	1188-14-3	429961
Trimethylaluminum	TMA	97%	Liquid	Melting point: 15 °C (lit.) Boiling point: 125-126 °C (lit.)	75-24-1	257222
Trimethylgallium	TMGa/TMG	-	Liquid	Melting point: -15.8 °C (lit.) Boiling point: 92.5 °C (lit.)	1445-79-0	730734
Metal β-diketonates						
Aluminum acetylacetonate	Al(acac) ₃	ReagentPlus®, 99%	Solid	Melting point: 190-193 °C (lit.) Boiling point: 315 °C (lit.)	13963-57-0	208248
Aluminum acetylacetonate	Al(acac) ₃	purified by sublimation, 99.999% trace metals basis	Solid	Melting point: 190-193 °C (lit.) Boiling point: 315 °C (lit.)	13963-57-0	674753
Cadmium acetylacetonate	Cd(acac) ₂	≥99.9% trace metals basis	Solid	Melting point: 209-214 °C (lit.)	14689-45-3	517585
Chromium(III) tris(2,2,6,6-tetramethyl-3,5-heptanedionate)	Cr(TMHD) ₃	-	Solid	Melting point: 228-233 °C (lit.)	14434-47-0	468223
Cobalt(III) acetylacetonate	Co(acac) ₃	99.99% trace metals basis	Solid	Melting point: 210-213 °C (lit.)	21679-46-9	494534
Copper bis(2,2,6,6-tetramethyl-3,5-heptanedionate)	Cu(TMHD) ₂	99%	Solid	Melting point: 198 °C (lit.)	14040-05-2	345083
Copper(II) trifluoroacetylacetonate	Cu(C ₅ H ₄ F ₃ O ₂) ₂	97%	Solid	Melting point: 198-199 °C (lit.)	14324-82-4	101826
Copper(II) hexafluoroacetylacetonate hydrate	Cu(hfac) ₂	Cu, 12.0-14.0% EDTA titration	Solid	Melting point: 130-134 °C (lit.)	155640-85-0	335193
Europium(III) acetylacetonate hydrate	Eu(acac) ₃	Eu, 32.6-35.0% EDTA titration (dried basis)	Solid	Melting point: 140 °C (lit.)	181266-82-0	393215
Gallium(III) acetylacetonate	Ga(acac) ₃	99.99% trace metals basis	Solid	Melting point: 196-198 °C (dec.) (lit.)	14405-43-7	393541
Indium(III) acetylacetonate	In(acac) ₃	≥99.99% trace metals basis	Solid	Melting point: 187-189 °C (lit.)	14405-45-9	13300
Iridium(III) acetylacetonate	Ir(acac) ₃	97%	Solid	Melting point: 269-271 °C (lit.)	15635-87-7	333352
Iron(III) acetylacetonate	Fe(acac) ₃	97%	Powder	Melting point: 180-182 °C (dec.) (lit.)	14024-18-1	F300
		≥99.9% trace metals basis	Solid	Melting point: 180-182 °C (dec.) (lit.)	14024-18-1	517003

Name	Synonyms/ Acronym	Purity / Description	Form	Thermal Behaviour	CAS No.	Cat. No.
Lanthanum(III) acetylacetonate hydrate	La(acac) ₃	La, 27.3-32.4% EDTA titration	Solid		64424-12-0	325759
Lead(II) acetylacetonate	Pb(acac) ₂	Technical grade	Solid	Melting point: 141-144 °C (lit.)	15282-88-9	401684
Lithium acetylacetonate	Li(acac)	97%	Solid	Melting point: 250 °C(lit.)	18115-70-3	413046
Neodymium(III) acetylacetonate hydrate	Nd(acac) ₃	Nd, 30.0-34.0% EDTA titration	Solid	Melting point: 143 °C (lit.)	64438-52-4	460427
Nickel(II) acetylacetonate	Ni(acac) ₂	95%	Solid	Melting point: 230 °C (lit.)	3264-82-2	283657
Palladium(II) acetylacetonate	Pd(C ₅ H ₇ O ₂) ₂	99%	Solid	Melting point: 200-251 °C (lit.)	14024-61-4	209015
Palladium(II) hexafluoroacetylacetonate	Pd(hfac) ₂	99.98% trace metals basis	Solid	Melting point: 216.3-223.7 °C (lit.)	3375-31-3	401471
Platinum(II) acetylacetonate	Pt(acac) ₂	97%	Solid	Melting point: 249-252 °C (lit.)	15170-57-7	282782
Rhodium(III) acetylacetonate	Rh(acac) ₃	97%	Solid	Melting point: 263-264 °C (lit.)	14284-92-5	282774
Ruthenium(III) acetylacetonate	Ru(acac) ₃	97%	Solid	Melting point: 260 °C (lit.)	14284-93-6	282766
Samarium(III) acetylacetonate hydrate	Sm(acac) ₂	≥99.9% trace metals basis	Solid		86322-73-8	517666
Silver acetylacetonate	Ag(acac)	98%	Solid	Melting point:100 °C (lit.)	15525-64-1	323489
Sodium hexafluoroacetylacetonate	NaC ₅ HF ₆ O ₂	97%	Solid		22466-49-5	436186
Tin(II) acetylacetonate	Sn(acac) ₂	99.9% trace metals basis	Liquid	Boiling point: 110 °C/0.1 mmHg	16009-86-2	697478
Vanadium(III) acetylacetonate	V(acac) ₃	97%	Solid	Melting point: 181-184°C(lit.)	13476-99-8	227110
Zinc acetylacetonate hydrate	Zn(acac) ₂	99.995% trace metals basis	Solid	Melting point: 135-138 °C (lit.)	108503-47-5	480991
Zirconium(IV) acetylacetonate	Zr(acac) ₄	97%	Solid		17501-44-9	338001
Zirconium(IV) trifluoroacetylacetonate	Zirconium Trifluoropentanedionate	97%	Solid	Melting point: 190 °C (lit.)	17499-68-2	383325
Metal Carbonyls						
(Acetylacetonato) dicarbonylrhodium(I)	Rh(CO) ₂ (C ₅ H ₇ O ₂)	98%	Solid	Melting point: 154-156 °C (lit.)	14874-82-9	288101
Bromopentacarbonyl-manganese(I)	BrMn(CO) ₅	98%	Solid	Melting point: 154 °C (lit.)	14516-54-2	341622
Cyclopentadienylmolybdenum(II) tricarbonyl, dimer	C ₁₆ H ₁₀ Mo ₂ O ₆	98%	Solid	Melting point: 222 °C (lit.)	12091-64-4	117609
Dirhenium decacarbonyl	Re ₂ (CO) ₁₀	98%	Solid	Melting point: 170 °C (lit.)	14285-68-8	245003
Iron(0) pentacarbonyl	Fe(CO) ₅	>99.99% trace metals basis	Liquid	Autoignition temp.122 °F, Boiling point: 103 °C (lit.)	13463-40-6	481718
Manganese(0) carbonyl	Mn ₂ (CO) ₁₀	98%	Solid	Melting point: 154 °C (lit.)	10170-69-1	245267
Molybdenumhexacarbonyl	Mo(CO) ₆	≥99.9% trace metals basis	Solid	Melting point: 150 °C (lit.) Boiling point: 156 °C (lit.)	13939-06-5	577766
Triosmium dodecacarbonyl	Os ₃ (CO) ₁₂	98%	Solid	Melting point: 224 °C (lit.)	15696-40-9	249742
Tungsten hexacarbonyl	W(CO) ₆	97%	Solid	Melting point: 150 °C(lit.)	14040-11-0	241431
		99.99% trace metals basis (excluding Mo), purified by sublimation	Solid	Melting point: 150 °C(lit.)	14040-11-0	472956

Name	Synonyms/ Acronym	Purity / Description	Form	Thermal Behaviour	CAS No.	Cat. No.
Silanes & Silanols						
(3-Aminopropyl)triethoxysilane	APTES, APTS	≥98.0%	Liquid	Boiling point: 217 °C/760 mmHg (lit.)	919-30-2	741442
1,2-Dichlorotetra- methyldisilane	Dichlorotetra- methyldisilane	95%	Liquid	Boiling point: 148-149 °C (lit.), Density: 1.005 g/mL at 25 °C (lit.)	4342-61-4	415456
Allyltrimethoxysilane		≥98%, deposition grade	Liquid	Boiling point: 146-148 °C (lit.) Density: 0.963 g/mL at 25 °C (lit.)	2551-83-9	679267
Hexadecyltrimethoxysilane	Trimethoxyhexa- decylsilane	technical, ≥85% (GC)	Liquid	Density: 0.89 g/mL at 20 °C (lit.)	16415-12-6	52360
Hexamethyldisilane	Trimethyl (trimethylsilyl) silane	98%	Liquid	Boiling point: 1112-114 °C (lit.), Melting point: 9-12 °C (lit.)	1450-14-2	217069
Methyltrichlorosilane	Trichloro (methyl) silane	deposition grade, ≥98% (GC), ≥99.99% (as metals)	Liquid	Boiling point: 66 °C (lit.)	75-79-6	679208
Tetraethyl orthosilicate	TEOS/ Tetraethyl silicate	99.999% trace metals basis	Liquid	Boiling point: 168 °C (lit.)	78-10-4	333859
Tetramethylsilane	Methyl silane	electronic grade, ≥99.99% trace metals basis	Liquid	Boiling point: 126-28 °C (lit.), Melting point: -99 °C (lit.)	75-76-3	523771
Triethoxy(octyl)silane	Octyltrie- thoxysilane	deposition grade, 97%, 99.99% trace metals basis	Liquid	Boiling point: 84-85 °C/0.5 mmHg (lit.)	2943-75-1	679305
Triethoxyvinylsilane	Vinyltrie- thoxysilane	≥98%, deposition grade	Liquid	Boiling point: 160-161 °C (lit.) 62-63 °C/20 mmHg (lit.), Density: 0.903 g/mL at 25 °C (lit.)	78-08-0	679275
Trimethoxy[3-(methylamino) propyl]silane	[3-(Methyl- amino)propyl] trimethoxysilane	95%	Liquid	Boiling point: 106 °C (lit.), Density: 0.975 g/mL at 25 °C (lit.)	3069-25-8	551635
Tris(tert-butoxy)silanol	TBS	99.999%	Solid	Boiling point: 205-210 °C (lit.), Melting point: 63-65 °C (lit.)	18166-43-3	553468
Tris(tert-pentoxysilanol	TPS	≥99.99%	Solid	Boiling point: 96-99 °C/2- 3 mmHg (lit.) Density: 0.944 g/mL at 25 °C (lit.)	17906-35-3	553441
Silicates						
Sodium metasilicate nonahydrate		≥98%	Powder		13517-24-3	54392
Tetraethyl orthosilicate	TEOS	reagent grade, 98%	Liquid	Boiling point: 168 °C (lit.) Density: 0.933 g/mL at 20 °C (lit.)	78-10-4	131903
		99.999% trace metals basis	Liquid	Boiling point: 168 °C (lit.) Density: 0.933 g/mL at 20 °C (lit.)	78-10-4	333859
Tetramethylammonium silicate solution	Tetramethyl- ammonium salt with silicic acid	15-20 wt. % in H ₂ O, ≥99.99% trace metals basis	Liquid	Density: 1.072 g/mL at 25 °C	53116-81-7	438669
Tetrapropyl orthosilicate	Tetrapro- poxysilane	≥98%, deposition grade	Liquid	Boiling point: 94 °C/5 mm Hg (lit.) Density: 0.933 g/mL at 20 °C (lit.)	682-01-9	679240

Name	Synonyms/ Acronym	Purity / Description	Form	Thermal Behaviour	CAS No.	Cat. No.
Metalloenes						
Bis(cyclopentadienyl)cobalt(II)	Cobaltocene	NA	Solid	Melting point: 176-180 °C (lit.)	1277-43-6	339164
Bis(cyclopentadienyl) ruthenium(II)	Ruthenocene	97%	Solid	Melting point: 199-201°C (lit.)	1287-13-4	262455
Bis(cyclopentadienyl) tungsten(IV) dihydride	Dicyclopentadieny tungsten dihydride	97%	Solid	Melting point: 115 °C(lit.)	1271-33-6	510807
Bis(ethylcyclopentadienyl) cobalt(II)	1,1'-Diethylcobaltocene	NA	Liquid	Density: 1.516 g/mL at 25 °C (lit.)	55940-05-1	510645
Bis(ethylcyclopentadienyl) nickel(II)	Nickelocene	NA	Liquid	Boiling point: 90 °C (lit.)	31886-51-8	510483
Bis(methylcyclopentadienyl) nickel(II)	1,1'-Dimethylnickelocene	97%	Liquid	Boiling point: 85-90 °C/1 mmHg (lit.), Melting point: 34-36 °C (lit.)	1293-95-4	510475
Bis(methyl-η5-cyclopentadienyl) methoxymethylzirconium	ZrD-CO ₄	NA	Liquid	Boiling point: 110 °C/ 0.5 mm Hg (lit.)		725471
Bis(pentamethylcyclopentadienyl)cobalt(II)	Decamethylcobaltocene	NA	Solid	Melting point: >210 °C (lit.)	74507-62-3	401781
Trimethyl(methylcyclopentadienyl)platinum(IV)	MeCpPtMe ₃	98%	Low-melting solid	Melting point: 30-31 °C (lit.)	94442-22-5	645605
Trimethyl(methylcyclopentadienyl)platinum(IV)	CpPtMe ₃	-	Low-melting solid	Melting point: 30-31 °C (lit.)	94442-22-5	697540
Tris(butylcyclopentadienyl) yttrium(III)	Y(n-BuCp) ₃	99.9% trace metals basis	Liquid	Density: 1.11 g/mL at 25 °C (lit.)	312739-77-8	524522
Metal Alkylamides						
Pentakis(dimethylamino) tantalum(V)	PDMAT, TADMA	99.99%	Solid	Melting point: 100 °C (lit.)	19824-59-0	496863
Tetrakis(diethylamido) hafnium(IV)	TDEAH	99.99%	Liquid	Boiling point: 130 °C/0.01 mmHg (lit.)	19824-55-6	455202
Tetrakis(dimethylamido) hafnium(IV)	TDMAH	≥99.99%	Low-melting solid	melting point: 26-29 °C (lit.)	19782-68-4	455199
Tetrakis(dimethylamido)tin(IV)	Tin(IV) dimethylamide	99.9% trace metals basis	Liquid		1066-77-9	698431
Tetrakis(dimethylamido) titanium(IV)	TDMAT	99.999% trace metals basis	Liquid	Boiling point: 50 °C/0.5 mmHg (lit.)	3275-24-9	469858
Tetrakis(dimethylamido) zirconium(IV)	TDMAZ	electronic grade, ≥99.99% trace metals basis	Solid	Melting point: 57-60 °C (lit.)	19756-04-8	579211
Tetrakis(ethylmethyldamido) hafnium(IV)	TEMAH	≥99.99% trace metals basis	Liquid	Boiling point: 78 °C/0.01 mmHg (lit.); Melting point: <-50 °C	352535-01-4	553123
Tetrakis(ethylmethyldamido) zirconium(IV)	TEMAZ	≥99.99% trace metals basis	Liquid	Boiling point: 81 °C/0.1 mmHg (lit.)	175923-04-3	553131
Tris(diethylamido)(tert-butylimido)tantalum(V)	TBTDET	≥99.99% trace metals basis	Liquid	Density: 1.252 g/mL at 25 °C (lit.)	169896-41-7	521280
Tris(dimethylamido) aluminum(III)	Hexakis (dimethylamido) dialuminum	-	Solid	Melting point: 82-84 °C (lit.) Density: 0.865 g/mL at 25 °C (lit.)	32093-39-3	469947

Name	Synonyms/ Acronym	Purity / Description	Form	Thermal Behaviour	CAS No.	Cat. No.
Precursors Packaged for Deposition systems <i>In addition, We also offer high-quality precursors for ALD safely and conveniently pre-packaged in steel cylinders suitable for use with a variety of deposition systems along with valves, allowing a controlled amount of material into the deposition chamber.</i>						
Trimethylaluminum	TMA	-	Liquid	Boiling point: 125-126 °C (lit.), Melting point: 15 °C (lit.)	75-24-1	663301
Tris(dimethylamino)silane	TDMAS	-	Liquid	Boiling point: 142 °C (lit.), melting point: -90 °C (lit.)	15112-89-7	759562
Tetraethyl orthosilicate	TEOS	-	Liquid	Boiling point: 168 °C (lit.), Density: 0.933 g/mL at 20 °C (lit.)	78-10-4	759414
(3-Aminopropyl)triethoxysilane	APTES or APTS	≥98%	Liquid	Boiling point: 217 °C/760 mmHg (lit.) Density: 0.946 g/mL at 25 °C (lit.)	919-30-2	706493
Silicon tetrachloride	Tetrachlorosilane	-	Liquid	Boiling point: 57.6 °C (lit.), Melting point: -70 °C (lit.)	10026-04-7	688509
Tetrakis(dimethylamido) titanium(IV)	TDMAT	-	Liquid	Boiling point: 50 °C/0.5 mmHg (lit.), Density: 0.947 g/mL at 25 °C (lit.)	3275-24-9	669008
Titanium tetrachloride	TTC	≥99.995% (trace metals analysis)	Liquid	Boiling point: 135-136 °C (lit.), Melting point: -25 °C (lit.)	7550-45-0	697079
Titanium(IV) isopropoxide	TTIP	99.999%(trace metals analysis)	Liquid	Boiling point: 232 °C (lit.), Melting point: 14-17 °C (lit.)	546-68-9	687502
Vanadium(V) oxytriisopropoxide	VTIP	-	Liquid	Boiling point: 80-82 °C/2 mmHg (lit.), Density: 1.035 g/mL at 25 °C (lit.)	5588-84-1	736007
Trimethylgallium	TMG	-	Liquid	Boiling point: 92.5 °C/ 760 mmHg (lit.), Density: 1.132 g/mL at 25 °C	1445-79-0	730734
Bis(methyl-η5-cyclopentadienyl) methoxymethylzirconium	ZRCMMM, ZrD-CO ₄	-	Liquid	Boiling point: 110 °C/ 0.5 mmHg (lit.)		725471
Tetrakis(dimethylamido) zirconium(IV)	TDMAZ	≥99.99% (trace metals analysis)	Solid	Melting point: 57-60 °C (lit.)	19756-04-8	669016
Tetrakis(ethylmethyldamido) zirconium(IV)	TEMAZ	-	Liquid	Boiling point: 81 °C/ 0.1 mmHg (lit.)	175923-04-3	725528
Tetrakis(dimethylamido) hafnium(IV)	TDMAH	≥99.99% (trace metals analysis)	Low-melting solid	Melting point: 26-29 °C (lit.)	19782-68-4	666610
Tetrakis(ethylmethyldamido) hafnium(IV)	TEMAH	-	Liquid	Boiling point: 78 °C/0.01 mmHg (lit.), Melting point: <-50 °C	352535-01-4	725544
Tris(diethylamido)(tert-butylimido)tantalum(V)	TBTDET	≥99.99% (trace metals analysis)	Liquid	Density: 1.252 g/mL at 25 °C (lit.)	169896-41-7	668990
Trimethyl(methylcyclopentadienyl)platinum(IV)	MeCpPtMe ₃	-	Low-melting solid	Melting point: 30-31 °C (lit.)	94442-22-5	697540
Tungsten hexacarbonyl	Tungsten carbonyl	99.9% (trace metals analysis)	Solid	Melting point: 150 °C (lit.)	14040-11-0	755737

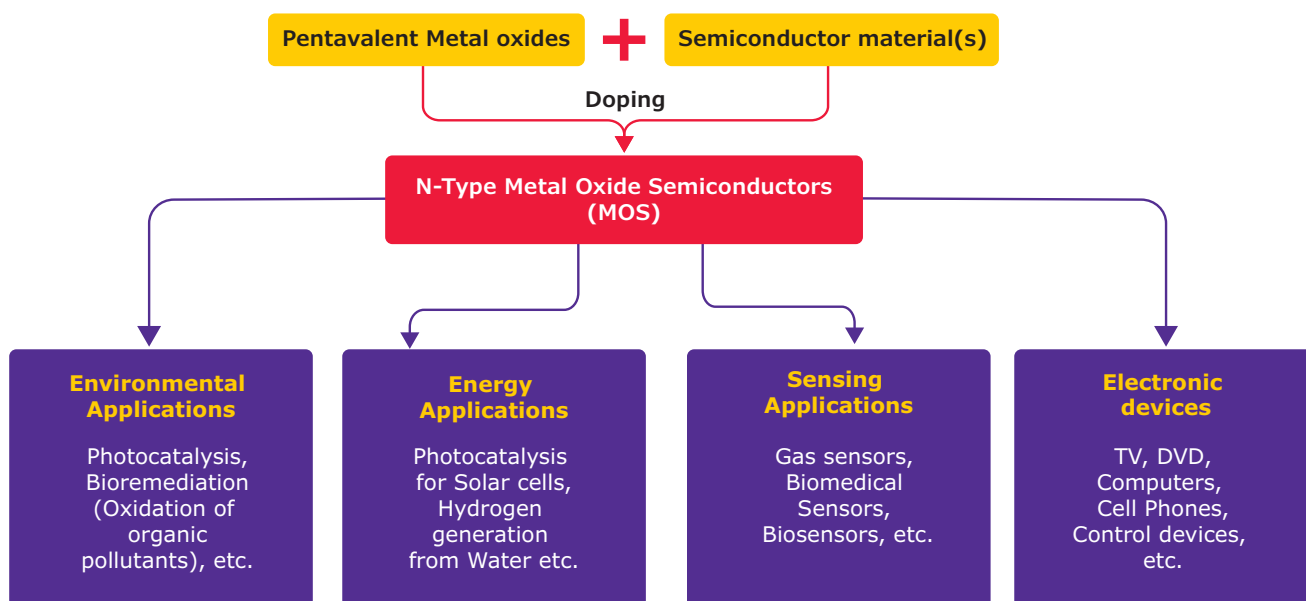
Materials for Semiconductor Applications

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Type	Name	Molecular formula	Purity /Description	CAS No.	Cat. No.
Metal Oxide Based Semiconductors					
N-type	Indium tin oxide	In ₂ O ₃ /SnO ₂	≥99.99% trace metals basis, –325 mesh, In ₂ O ₃ , 90%, SnO ₂ , 10%	50926-11-9	494682
	Indium(III) oxide	In ₂ O ₃	99.998% trace metals basis	1312-43-2	203424
	Molybdenum(VI) oxide	MoO ₃	99.97% trace metals basis	1313-27-5	203815
	Silicon dioxide	SiO ₂	–325 mesh, 99.5% trace metals basis	14808-60-7	342890
			≥99.9% trace metals basis		85356
			≥99.995% trace metals basis		204358
	Tin(IV) oxide	SnO ₂	≥99.99% trace metals basis	18282-10-5	204714
	Titanium(IV) oxide, anatase	TiO ₂	powder, –325 mesh, ≥99% trace metals basis	1317-70-0	248576
			powder, 99.8% trace metals basis		232033
	Titanium(IV) oxide, rutile		≥99.98% trace metals basis	1317-80-2	204757
			99.995% trace metals basis		204730
	Tungsten(VI) oxide	WO ₃	powder, ≤25 µm, ≥99% trace metals basis	1314-35-8	232785
	Tungsten(VI) oxide		powder, 99.995% trace metals basis		204781
	Zinc oxide	ZnO	99.99% trace metals basis	1314-13-2	255750
			99.999% trace metals basis		204951
P-type	Aluminum oxide	Al ₂ O ₃	99.997% trace metals basis	1344-28-1	202606
	Copper(I) oxide	Cu ₂ O	97%, ≤7 µm	1317-39-1	208825
			≥99.99% trace metals basis, anhydrous		566284
	Copper(II) oxide	CuO	99.999% trace metals basis	1317-38-0	203130
	Nickel(II) oxide	NiO	≥99.995% trace metals basis	1313-99-1	481793
	Tin(II) oxide	SnO	99.99% trace metals basis	21651-19-4	518174
Ceramic Semiconductors					
Wide Band Gap	Aluminum nitride	AlN	≥98%, 10 µm	24304-00-5	241903
			<100 nm		593044
	Aluminum sulfide	Al ₂ S ₃	98%, granular, <10 mm	1302-81-4	333182
	Aluminum-doped zinc oxide nanoparticle ink	Al-ZnO	2.5 wt. %, viscosity 2.2 cP, work function -3.9 eV	-	808237
	Boron nitride	BN	>90%, Multiwalled	10043-11-5	912085
			>80%, multiwalled		919500
			>70%, Multiwalled		913332
			98%, ~1 µm		255475
	CdTe core-type quantum dots	CdTe	COOH functionalized, fluorescence λem 770 nm	215-149-9	777994
	Copper indium sulfide zinc sulfide core/shell Qdots	(CuInS ₂ /ZnS)	in toluene, fluorescence λem 560 nm, 1 mg/mL	-	924288
	Gallium nitride	GaN	99.9% trace metals basis	25617-97-4	481769
	Germanium(II) sulfide	GeS	99.99% trace metals basis	12025-32-0	484539
	Indium tin oxide	ITO	≥99.5% trace metals basis, 18 nm particle size (SEM), 20 wt. % in H ₂ O	50926-11-9	747939
			30 nm (SEM)		790346
	Indium(III) sulfide red	In ₂ S ₃	99.99% trace metals basis	12030-24-9	308293
	Manganese(II) sulfide	MnS	~100 mesh, powder	18820-29-6	400947
	Zinc selenide	ZnSe	99.99% trace metals basis, powder, 10 µm	1315-09-9	244619
	Zinc telluride	ZnTe	99.99% trace metals basis, –100 mesh, powder	1315-11-3	254320

Type	Name	Purity /Description	CAS No.	Cat. No.
Organic Semiconductors				
N-type	IEICO	≥99% (HPLC)	2055812-53-6	913006
	PCBM	>99%	160848-22-6	684430
		>99.5%		684449
		>99.9%		684457
	PFN-DOF	M _w >10,000	673474-75-4	900966
	Tetracene	sublimed grade, 99.99% trace metals basis	92-24-0	698415
	Y5	≥99% (HPLC)	2304444-48-0	912751
	Y6		2304444-49-1	908509
P-type	Y7	≥99% (HPLC)		913251
	2,4-Spiro-OMeTAD	≥98.5% (HPLC)	2102348-92-3	923230
	CuPc	≥98%	147-14-8	932515
		Dye content >99 %		546682
	P3HT	average M _w 20,000-45,000	104934-50-1	900563
		average M _w 50,000-75,000		900550
		average M _w 85,000-100,000		900549
	Pentacene	sublimed grade, ≥99.9% trace metals basis	135-48-8	684848
	PFO	M _w 50,000-150,000 by GPC	102130-78-4	923214
	PFO-DBT	average M _w 10,000-50,000	782469-77-6	754013
	Poly[(9,9-dioctylfluorenyl-2,7-diyl)-co-(4,4'-(N-(p-butylphenyl))diphenylamine)]	M _w ≥27,000 by GPC	223569-31-1	932167
	Poly-TPD	M _w ≥20,000 g/mol		907065
	Rubrene	≥98% (HPLC)	517-51-1	554073
		≥99% (HPLC)		932450
		sublimed grade, 99.99% trace metals basis		551112
P-type; Wide Band Gap	Spiro-MeOTAD	99% (HPLC)	207739-72-8	792071
	F8BT	average M _n ≤25000	-	698687
		average M _w >20,000	-	900979
	MEH-PPV	average M _n 40,000-70,000	-	541443
		average M _n 70,000-100,000	-	541435

Self-assembly & Contact printing

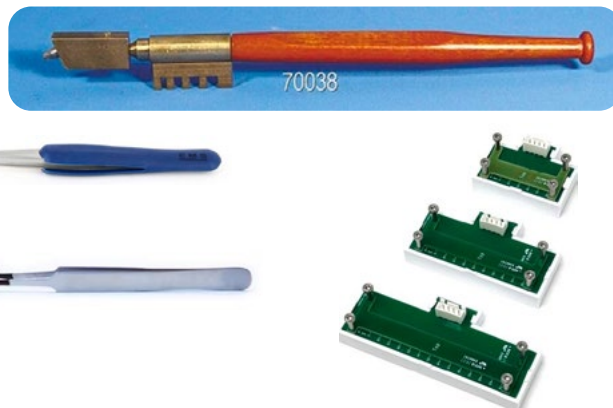
Designed specifically for the semiconductor industry, our materials enable you to create intricately structured semiconductor architectures with enhanced functionality, as well as optimize contact printing processes. Ultimately, this accelerates product development and gives you a competitive edge in the dynamic semiconductor landscape.

Product Name	Description/purity	CAS	Cat. No.
(3-Aminopropyl)triethoxysilane	packaged for use in deposition systems, $\geq 98\%$	919-30-2	706493
	$\geq 98.0\%$		741442
	99%		440140
(3-Aminopropyl)trimethoxysilane	97%	13822-56-5	281778
Bis(10-carboxydecyl)disulfide	99%	23483-56-9	674451
S-(4-Bromobutyl) thioacetate	96% (GC)	14475-59-3	760714
1-Dodecanethiol	98%	112-55-0	471364
3-Glycidoxypropyltrimethoxysilane	$\geq 98\%$	2530-83-8	440167
11-Mercaptoundecanoic acid	95%	71310-21-9	450561
11-Mercaptoundecylphosphoric acid	90%	188678-49-1	674311
Octenyltrichlorosilane	mixture of isomers	153447-97-3	539279
1H,1H,2H,2H-Perfluorooctanephosphonic acid	95%	252237-40-4	737461
Poly(dimethylsiloxane), hydroxy terminated	average $M_n \sim 550$, viscosity ~ 25 cSt	70131-67-8	481939
Polymethylmethacrylate	powder, $\leq 0.75\%$ water (KF)	9011-14-7	182265
1,11-Undecanedithiol	99%	63476-06-2	674281

Solutions and Specialized Substrates for the Semiconductor Industry

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Designed for precision, reliability, and efficiency, these resources provide semiconductor professionals with everything needed to advance manufacturing processes and achieve new heights in technological development.



Name	Molecular formula	Purity/Description	CAS No.	Cat. No.
Polishing Abrasives				
Aluminum oxide	Al_2O_3	~100 micron	1344-28-1	769290
		99.95%, 5 nm		934054
Silicon carbide	SiC	-200 mesh	7440-22-4	373249
		99%, 0.1-1 micron		GF10020339
		99%, 18 nm		933740

Product Name	Cat. No.
Handling Tools for Cleanrooms	
AFM Disc Gripper, 15 mm	932973
AFM Disc Gripper, 20 mm	932981
Diamond Glass Cutter	933392
Tweezer, Style 2AB, ESD Rubber Coated	932795
Tweezer, Style 51S, ESD Rubber Coated	932809
Tweezer, Style AA, ESD Rubber Coated Boley	932868
Wafer tweezer, Style 45WF, PTFE Coated	933481
Wafer tweezer, Style 6WF, PTFE Coated	933503
Wafer tweezers Style 43LB-4 Peek	933015
Wafer tweezers, Style 43LB-8 Peek	933007
Probe Kits for Electrical Resistance Tests	
Probe kit, Four line	934852
Probe Kit, Four-node	934860
4-Point Probing Chip	4P100
4-Point Probing Chip	4P101

Product Name	Description	Cat. No.
Specialized Substrates		
Boron nitride on SiO ₂ /Si substrate	4" diam. wafer	SIBN4W
	10 mm x 10 mm coupon	SIBNC
Monolayer graphene on Si/SiO ₂ wafer	99.999% (Au), layer thickness 1000 Å, 99.99% (Ti)	920959
Gold coated silicon wafer	diam. 100 mm (4 in.)	643262
Monolayer hexagonal boron nitride (hBN) on Si/SiO ₂ wafer	diam. 100 mm (4 in.)	920932
	diam. 150 mm (6 in.)	920940
	diam. 200 mm (8 in.)	920924
R2R Monolayer large grain CVD graphene on silicon wafer	avg. no. of layers, 1, 6 in diameter	920134
	4 in diameter, avg. no. of layers, 1	920126
R2R Monolayer small grain CVD graphene on silicon wafer	4 in diameter, avg. no. of layers, 1	920118
Silicon	wafer (single side polished), <100>, N-type, contains no dopant, diam. x thickness 2 in. x 0.5 mm	646687
	wafer (single side polished), <111>, N-type, contains no dopant, diam. x thickness 2 in. x 0.5 mm	647101
	wafer (single side polished), <100>, N-type, contains no dopant, diam. x thickness 3 in. x 0.5 mm	647535
	wafer (single side polished), <111>, N-type, contains no dopant, diam. x thickness 3 in. x 0.5 mm	647543
	wafer (single side polished), <100>, P-type, contains boron as dopant, diam. x thickness 2 in. x 0.5 mm	647675
	wafer (single side polished), <100>, P-type, contains boron as dopant, diam. x thickness 3 in. x 0.5 mm	647764
	wafer, <111>, P-type, contains boron as dopant, diam. x thickness 2 in. x 0.3 mm	647705
	wafer (single side polished), <111>, P-type, contains boron as dopant, diam. x thickness 3 in. x 0.5 mm	647772
Electronic Chemicals and Solvents		
2-Propanol	Electronic grade, 99.999% trace metals basis	733458
ElectroGreen™, Acetone substitute for electronics, bio-sourced	Relative Evaporation rate: 2.84 Hansen solubility parameters: SPd = 7.7; SPp = 3.4; SPh = 6.1	929670
ElectroGreen™, Isopropyl Alcohol substitute for electronics, bio-based	Relative Evaporation rate: 1.24 Hansen solubility parameters: SPd = 7.7; SPp = 4.2; SPh = 8.8	929654
ElectroGreen™, NMP substitute for electronics - type 1, bio-sourced	Relative Evaporation rate: <0.05 Hansen solubility parameters: SPd = 8.8; SPp = 5.9; SPh = 3.7	929719
ElectroGreen™, NMP substitute for electronics - type 2, bio-sourced	Relative Evaporation rate: <0.02 Hansen solubility parameters: SPd = 9.0; SPp = 6.8; SPh = 4.6	929662
ElectroGreen™, Toluene substitute for electronics, bio-sourced	Relative Evaporation rate: 2.57 Hansen solubility parameters: SPd = 7.7; SPp = 2.8; SPh = 6	929689

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