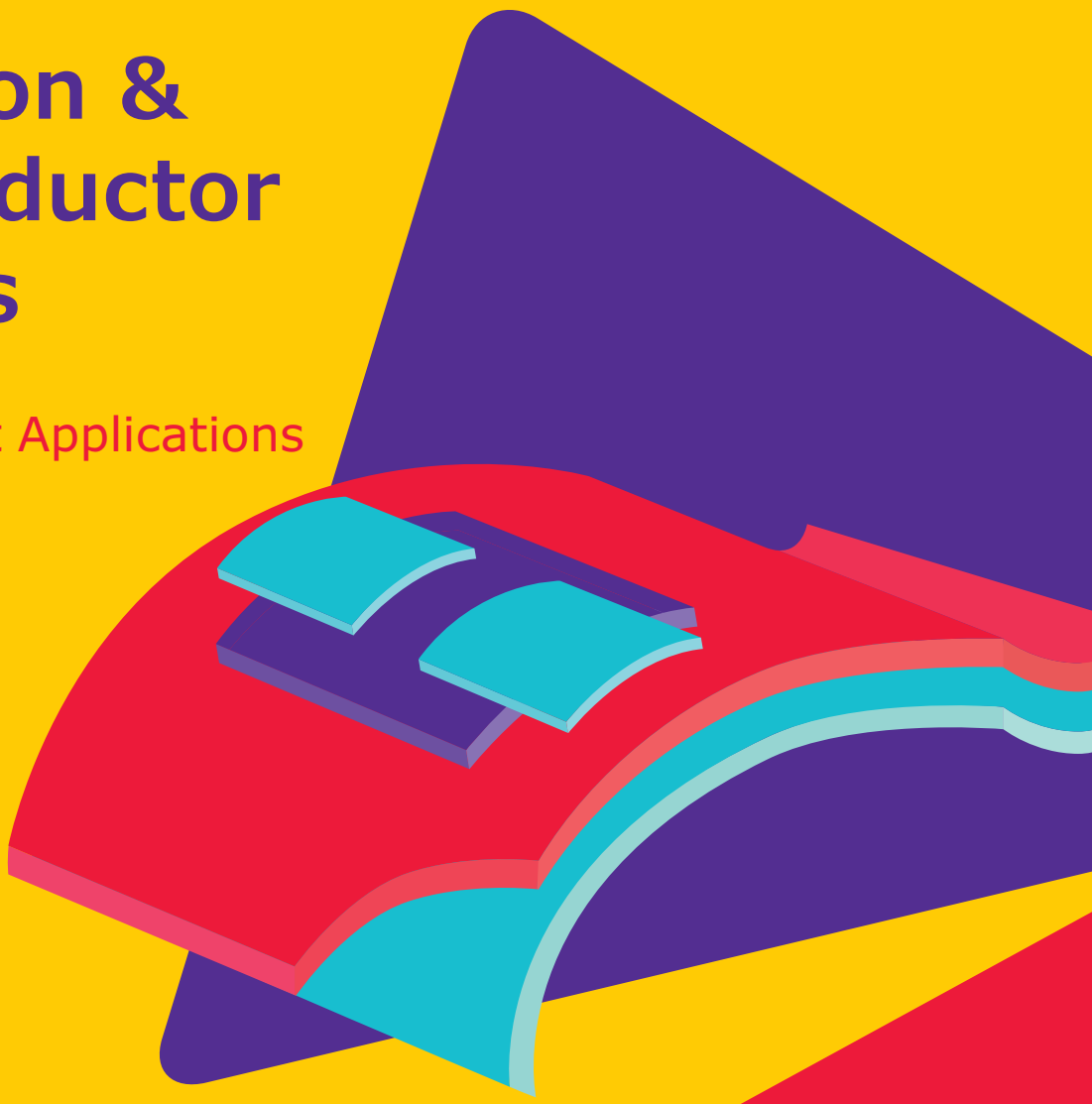
MilliporeSigma

Deposition & Semiconductor Materials

Enabling State-of-the-Art Applications



Sigma-Aldrich®

Lab & Production Materials

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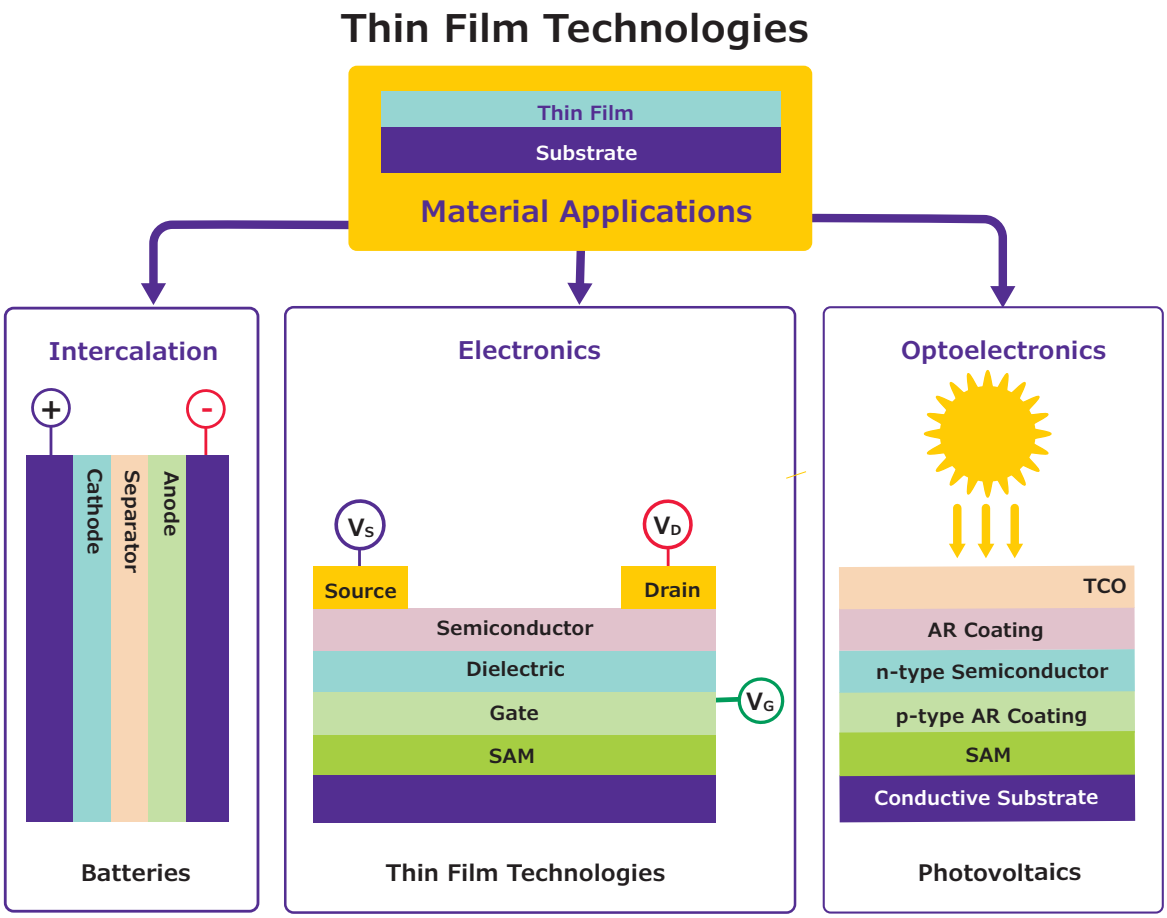
Enabling Cutting-Edge Technology with Deposition & Semiconductor Materials

Chemical solution deposition and chemical vapor deposition are two advanced methods utilized for producing precise thin solid films and coatings of high quality. These method 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**



Solution Deposition Precursors

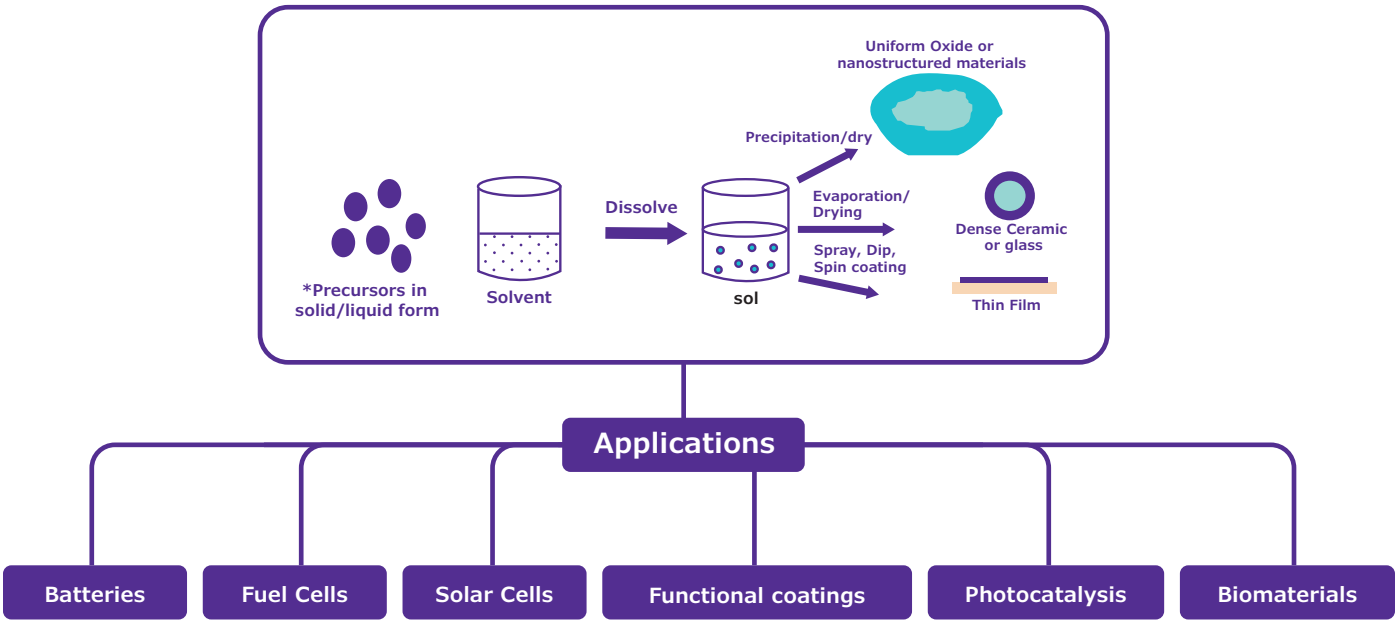
The use of solution deposition precursors has expanded to encompass a wide variety of chemical processes. In fact, it is now more broadly characterized as encompassing the creation of solid materials, including metal oxides, from precursor solutions.

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



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	$3Al_2O_3 \cdot 2SiO_2$	NA	Solid	12141-46-7	**520179**
Diethylaluminum ethoxide	$(C_2H_5)_2AlOC_2H_5$	97%	Solid	1586-92-1	**256749**
Aluminum-tri-sec-butoxide	$Al[OCH(CH_3)C_2H_5]_3$	97%	Liquid	2269-22-9	**201073**
Antimony(III) acetate	$Sb(CH_3CO_2)_3$	99.99% trace metals basis	Solid	6923-52-0	**483265**
Antimony(III) ethoxide	$Sb(OC_2H_5)_3$	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	$Ba(CH_3COO)_2$	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	$Cd(CH_3CO_2)_2 \cdot xH_2O$	≥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	$Ce(CH_3CO_2)_3 \cdot xH_2O$	99.99% trace metals basis	Solid	206996-60-3	**529559**
Cobalt(II) acetate	$Co(CH_3CO_2)_2$	99.99% trace metals basis	Solid	71-48-7	**399973**
Cobalt(II) 2-ethylhexanoate solution	$Co[CH_3(CH_2)_3CH(C_2H_5)CO_2]_2$	65 wt. % in mineral spirits	Liquid	136-52-7	**444545**
Copper(II) acetate	$Cu(CO_2CH_3)_2$	powder, 99.99% trace metals basis	Solid	142-71-2	**517453**
Copper(II) acetate monohydrate	$Cu(CO_2CH_3)_2 \cdot H_2O$	99.99% trace metals basis	Solid	6046-93-1	**229601**
Dysprosium(III) acetate hydrate	$(CH_3CO_2)_3Dy \cdot 4H_2O$	99.9% trace metals basis	Solid	15280-55-4	**325538**
Ethyl acetoacetate sodium salt	$CH_3C(ONa)=CHCO_2C_2H_5$	NA	Solid	20412-62-8	**164100**
Erbium(III) acetate hydrate	$Er(CH_3CO_2)_3 \cdot xH_2O$	99.9% trace metals basis	Solid	207234-04-6	**325570**
Europium(III) acetate hydrate	$Eu(CH_3CO_2)_3 \cdot xH_2O$	99.999% trace metals basis	Solid	62667-64-5	**545090**
		99.9% trace metals basis			**325627**
Gadolinium(III) acetate hydrate	$Gd(CH_3CO_2)_3 \cdot xH_2O$	99.9% trace metals basis	Solid	100587-93-7	**325678**
Germanium(IV) ethoxide	$Ge(OC_2H_5)_4$	≥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	$Ho(CH_3CO_2)_3 \cdot xH_2O$	99.99% trace metals basis	Solid	312619-49-1	**467332**
Indium(III) acetate	$In(C_2H_3O_2)_3$	99.99% trace metals basis	Solid	25114-58-3	**510270**
Iron(II) acetate	$Fe(CO_2CH_3)_2$	≥99.99% trace metals basis	Solid	3094-87-9	**517933**
Lanthanum(III) acetate hydrate	$La(CH_3CO_2)_3 \cdot xH_2O$	99.9% trace rare earth metals basis	Solid	100587-90-4	**306339**
Lead(II) acetate trihydrate	$Pb(CH_3CO_2)_2 \cdot 3H_2O$	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	$Lu(CH_3CO_2)_3 \cdot xH_2O$	99.9% trace metals basis	Solid	207500-05-8	**325783**
Magnesium ethoxide	$Mg(OC_2H_5)_2$	98%	Solid	2414-98-4	**291846**
Manganese(II) acetate tetrahydrate	$Mn(CH_3COO)_2 \cdot 4H_2O$	≥99%	Solid	6156-78-1	**221007**
		99.99% trace metals basis			**229776**
Nickel(II) acetate tetrahydrate	$Ni(OCOCH_3)_2 \cdot 4H_2O$	99.995% trace metals basis	Solid	6018-89-9	**379883**
		98%			**244066**
Niobium(V) ethoxide	$Nb(OCH_2CH_3)_5$	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	$Pd(C_2H_5CO_2)_2$	≥99.9% trace metals basis	Solid	3386-65-0	**481165**
Potassium tert-butoxide solution	$(CH_3)_3COK$	1.0 M in THF	Liquid	865-47-4	**328650**
Potassium acetate	CH_3COOK	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	$(CH_3CO_2)_3Sm \cdot xH_2O$	99.9% trace metals basis	Solid	100587-91-5	**325872**

Name	Molecular formula	Purity	Form	CAS No.	Cat. No.
Scandium(III) acetate hydrate	$(CH_3CO_2)_3Sc \cdot xH_2O$	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	$Sr(OCH(CH_3)_2)_2$	99.9% trace metals basis	Solid	88863-33-6	**440698**
Tantalum(V) ethoxide	$Ta(OC_2H_5)_5$	99.98% trace metals basis	Solid	6074-84-6	**339113**
Tantalum(V) butoxide	$Ta(OCH_2CH_2CH_2CH_3)_5$	99.99% trace metals basis	Liquid	51094-78-1	**383333**
Terbium(III) acetate hydrate	$Tb(CH_3CO_2)_3 \cdot xH_2O$	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	$Sn(CH_3CO_2)_4$	Sn, 31.4-35.5% gravimetric	Solid	2800-96-6	**345172**
Tin(IV) tert-butoxide	$Sn(OC(CH_3)_3)_4$	≥99.99% trace metals basis	low-melting solid	36809-75-3	**494135**
Titanium(IV) isopropoxide	$Ti[OCH(CH_3)_2]_4$	99.999% trace metals basis	Liquid	546-68-9	**377996**
Titanium(IV) butoxide	$Ti(OCH_2CH_2CH_2CH_3)_4$	reagent grade, 97%	Liquid	5593-70-4	**244112**
Vanadium(V) oxytriethoxide	$OV(OC_2H_5)_3$	95%	Liquid	1686-22-2	**470775**
Ytterbium(III) acetate tetrahydrate	$Yb(C_2H_3O_2)_3 \cdot 4H_2O$	99.9% trace metals basis	Solid	15280-58-7	**326011**
Yttrium(III) acetate hydrate	$Y(CH_3CO_2)_3 \cdot xH_2O$	99.9% metals basis	Solid	304675-69-2	**326046**
Yttrium(III) butoxide solution	$Y(OC_4H_9)_3$	0.5 M in toluene, ≥99.9% trace metals basis	Liquid	111941-71-0	**510661**
Zinc acetate dihydrate	$Zn(CH_3COO)_2 \cdot 2H_2O$	99.999% trace metals basis	Solid	5970-45-6	**379786**
Zirconium(IV) ethoxide	$Zr(OC_2H_5)_4$	97%	Solid	18267-08-8	**339121**
Zirconium(IV) butoxide solution	$Zr(OC_4H_9)_4$	80 wt. % in 1-butanol	Liquid	1071-76-7	**333948**

Physical Vapor Depostion (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

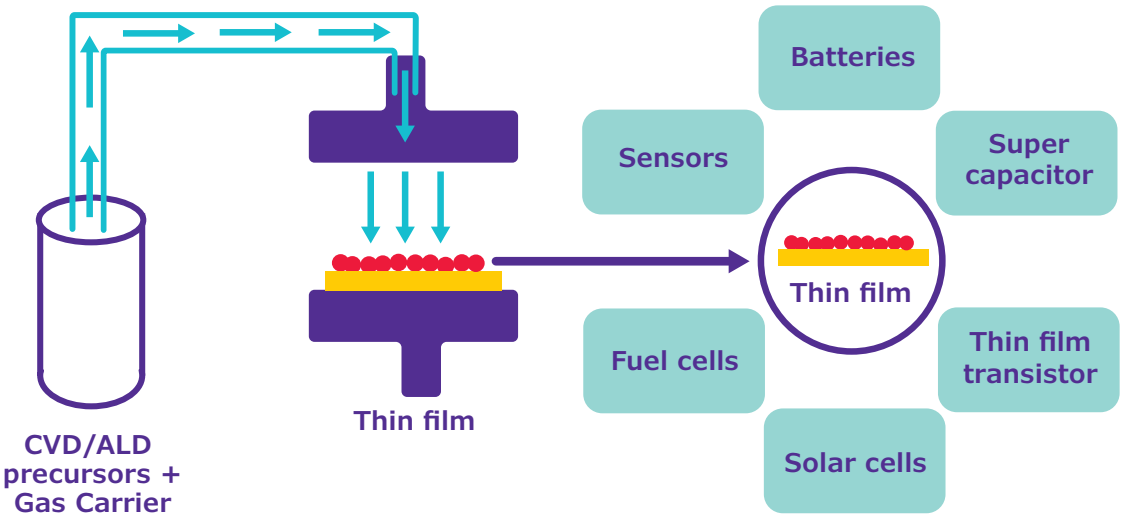
The ALD and CVD precursors, play a vital role in producing nanometer-thin layers of metals, semiconductors, and insulating materials. These essential materials are used in advanced electronics, efficient solar panels, memory devices, computer chips, and a wide range of high-performance tools.

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 aromic 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



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_6Ge_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_4Ge/ 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	$Cu(C_5H_4F_3O_2)_2$	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	**I3300**
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	$Pd(C_5H_7O_2)_2$	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	$NaC_5HF_6O_2$	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 Trifluoropen-tanedionate	97%	Solid	Melting point: 190 °C (lit.)	17499-68-2	**383325**
Metal Carbonyls						
(Acetylacetonato) dicarbonylrhodium(I)	$Rh(CO)_2(C_5H_7O_2)$	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**
Cyclopentadienylmol-ybdenum(II) tricarbonyl, dimer	$C_{16}H_{10}Mo_2O_6$	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	Dichlorotetram-ethyldisilane	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-pentoxy)silanol	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	**S4392**
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_2O, ≥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.
Metallocenes						
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	Dicyclopentadi-enyltungsten dihydride	97%	Solid	Melting point: 115 °C(lit.)	1271-33-6	**510807**
Bis(ethylcyclopen-tadienyl) cobalt(II)	1,1′-Diethyl-cobaltocene	NA	Liquid	Density: 1.516 g/mL at 25 °C (lit.)	55940-05-1	**510645**
Bis(ethylcyclopen-tadienyl) nickel(II)	Nickelocene	NA	Liquid	Boiling point: 90 °C (lit.)	31886-51-8	**510483**
Bis(methylcyclopen-tadienyl) nickel(II)	1,1′-Dimethyl-nickelocene	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(pentamethyl-cyclopentadienyl)cobalt(II)	Decamethyl-cobaltocene	NA	Solid	Melting point: >210 °C (lit.)	74507-62-3	**401781**
Trimethyl(methyl-cyclopentadienyl)platinum(IV)	$MeCpPtMe_3$	98%	Low-melting solid	Melting point: 30-31 °C (lit.)	94442-22-5	**645605**
Trimethyl(methyl-cyclopentadienyl)platinum(IV)	$CpPtMe_3$	-	Low-melting solid	Melting point: 30-31 °C (lit.)	94442-22-5	**697540**
Tris(butylcyclopentadienyl) yttrium(III)	$Y(n\text{-}BuCp)_3$	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(ethylmethylamido) 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(ethylmethylamido) 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 ***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.***						
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(ethylmethylamido) 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(ethylmethylamido) 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(methylcyclope-ntadienyl)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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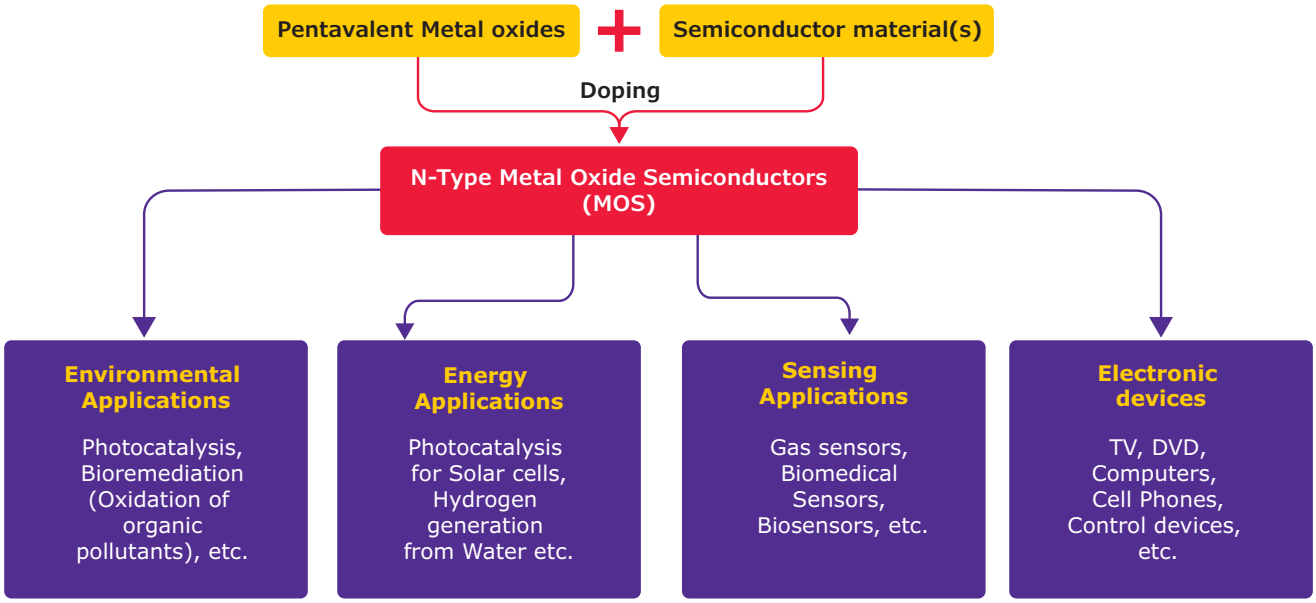

Type	Name	Molecular formula	Purity /Description	CAS No.	Cat. No.
Metal Oxide Based Semiconductors					
N-type	Indium tin oxide	In_2O_3/SnO_2	≥99.99% trace metals basis, −325 mesh, In_2O_3, 90%, SnO_2, 10%	50926-11-9	**494682**
	Indium(III) oxide	In_2O_3	99.998% trace metals basis	1312-43-2	**203424**
	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_2O_3	99.997% trace metals basis	1344-28-1	**202606**
	Copper(I) oxide	Cu_2O	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_2S_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_2O	50926-11-9	**747939**
			30 nm (SEM)		**790346**
	Indium(III) sulfide red	In_2S_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**
	Y7	≥99% (HPLC)		**913251**
P-type	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**
	Spiro-MeOTAD	99% (HPLC)	207739-72-8	**792071**
P-type; Wide Band Gap	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, ≥98%	919-30-2	**706493**
	≥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-Dodecanothiol	98%	112-55-0	**471364**
3-Glycidoxypropyltrimethoxisilane	≥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 ~550, viscosity ~25 cSt	70131-67-8	**481939**
Polymethilmethacrylate	powder, ≤0.75% water (KF)	9011-14-7	**182265**
1,11-Undecanedithiol	99%	63476-06-2	**674281**

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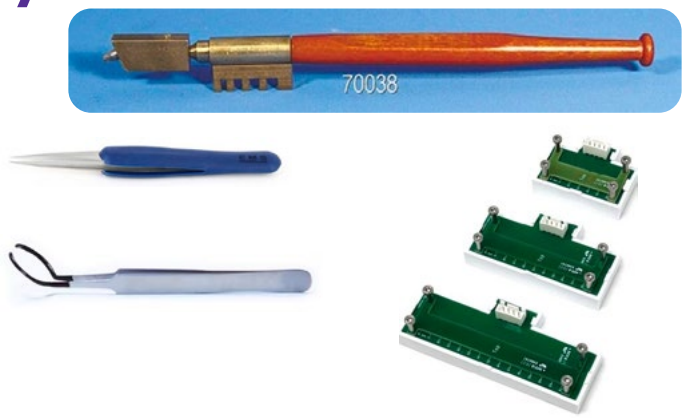

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Name	Molecular formula	Purity/Description	CAS No.	Cat. No.
Polishing Abrasives				
Aluminum oxide	Al_2O_3	~100 micron	1344-28-1	**769290**
		99.95%, 5 nm		**934054**
Silicon carbide	SiC	-200 mesh	7440-22-4	**373249**
		99%, 0.1-1 micron		**GF10020339**
		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. × thickness 2 in. × 0.5 mm	**646687**
	wafer (single side polished), <111>, N-type, contains no dopant, diam. × thickness 2 in. × 0.5 mm	**647101**
	wafer (single side polished), <100>, N-type, contains no dopant, diam. × thickness 3 in. × 0.5 mm	**647535**
	wafer (single side polished), <111>, N-type, contains no dopant, diam. × thickness 3 in. × 0.5 mm	**647543**
	wafer (single side polished), <100>, P-type, contains boron as dopant, diam. × thickness 2 in. × 0.5 mm	**647675**
	wafer (single side polished), <100>, P-type, contains boron as dopant, diam. × thickness 3 in. × 0.5 mm	**647764**
	wafer, <111>, P-type, contains boron as dopant, diam. × thickness 2 in. × 0.3 mm	**647705**
	wafer (single side polished), <111>, P-type, contains boron as dopant, diam. × thickness 3 in. × 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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