

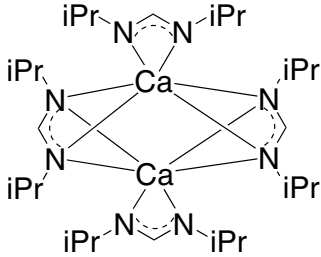
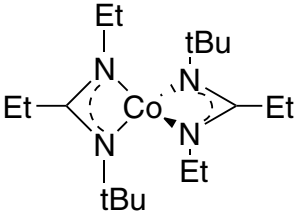
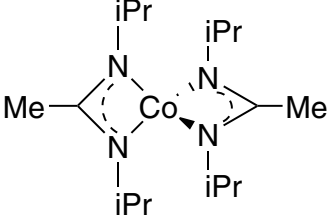
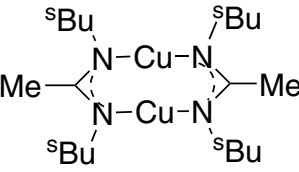
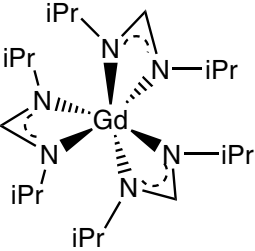
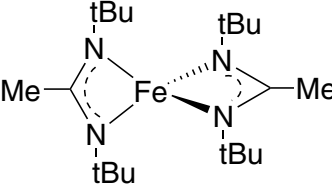
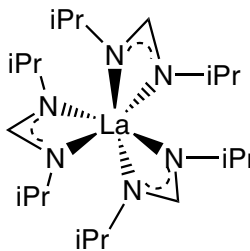
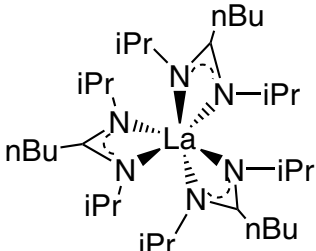
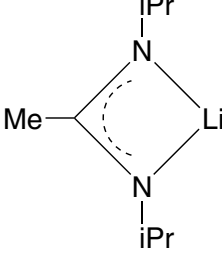
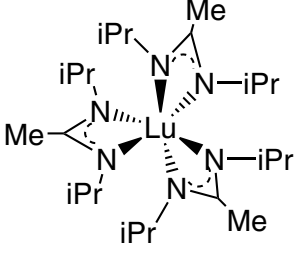
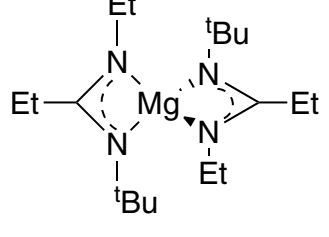
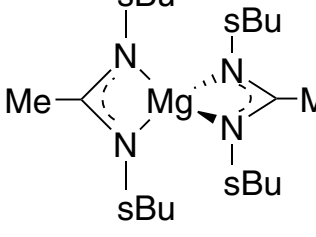
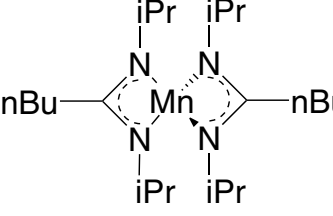
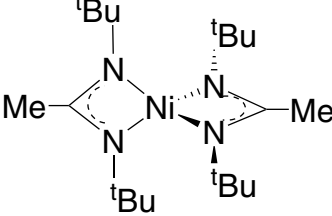
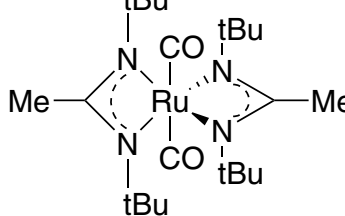
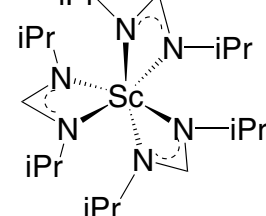
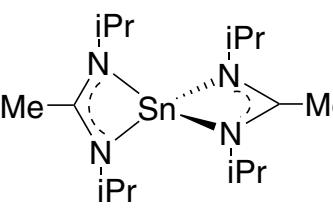
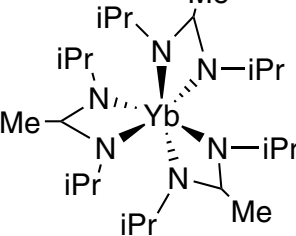
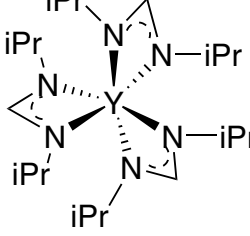
STREM CATALOG

Part of Ascensus Specialties

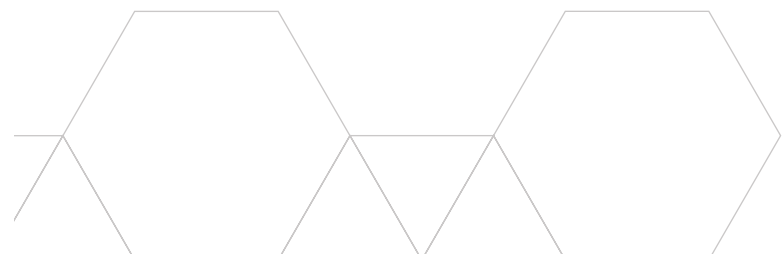


Metal Amidinates for CVD/ALD Applications

Metal Amidinates for CVD/ALD Applications

 20-8200	 27-0468 & 27-0469	 27-0485 & 27-0486	 29-7100
 64-3575	 26-0145	 57-1200	 57-1500
 03-8000	 71-1050	 12-0865	 12-0845
 25-0230	 28-0045	 44-0056	 21-1200
 50-1170	 70-1000	 39-1550	

These products are sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2



20-8200 Bis(N,N'-diisopropylformamidinato)calcium(II) dimer, (99.99 %-Ca) PURATREM (1959584-78-1) $C_{28}H_{60}Ca_2N_8$; FW: 588.99; tan to light-brown pwdr.*air sensitive, moisture sensitive*Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.1g
5g

Technical Note:

1. Calcium amidinate precursor for the atomic layer deposition (ALD) of calcium containing thin films.

Target Deposit	Deposition Technique	Delivery Temperature	Pressure	Co-reactants	Deposition Temperature	Ref.
CaS	ALD	140 °C		H ₂ S	150-280 °C	[1]

Thermal Behavior:

- TGA available in [1]
- Melting point 110-116 °C [1]
- Distillation at 110-115 °C at 0.2 Torr [1]
- Decomposition temperature ~280 °C (in deposition process) [1]

References:

1. *Angew. Chem. Int. Ed.* **2016**, 55, 10228.

27-0468 Bis(N-t-butyl-N'-ethylpropanimidamidato)cobalt(II), min. 98% (1011477-51-2) $C_{18}H_{38}CoN_4$; FW: 369.45; blue-green liq.*air sensitive, moisture sensitive*Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.1g
5g

Technical Note:

1. Liquid cobalt amidinate for ALD and CVD of cobalt metal and composite thin films.

Target Deposit	Deposition Technique	Delivery Temperature	Pressure	Co-reactants	Deposition Temperature	Ref.
Co	ALD	80 °C	0.26 Torr	H ₂	265 °C	[3, 4]
CoWx	ALD	90 °C	0.3 Torr	W(N ^t Bu) ₂ (NMe ₂) ₂ , NH ₃	375 °C	[5]
CoWx	CVD	90 °C	3 Torr	W(N ^t Bu) ₂ (NMe ₂) ₂ , NH ₃	375 °C	[5]
CoO	ALD	80 °C		H ₂ O	180 °C	[8]
CoNx	CVD	70-85 °C	1-5 Torr	NH ₃ , H ₂	100-200 °C	[2, 6]
Co:TiN	ALD	75 °C		Ti(NMe ₂) ₄ , NH ₃	200 °C	[7]

Thermal Behavior:

- Vapor pressure: 0.06 Torr at 50 °C [1], 0.26 Torr at 85 °C [2]
- TGA available in [1]
- Melting point: -17 °C [1, 2]

References:

1. *Dalton Trans.*, **2008**, 2592.
2. *ECS J. Solid State Sci. Technol.* **2012**, 1, N79.
3. *Chem. Mater.* **2014**, 26, 2642.
4. *J. Phys. Chem. Lett.* **2014**, 5, 1091.
5. *J. Mater. Chem. C*, **2015**, 3, 2500.
6. *ECS J. Solid State Sci. Technol.* **2017**, 6, P345.
7. *J. Alloys Compd.* **2018**, 737, 684.
8. *J. Vac. Sci. Technol. A*, **2019**, 37, 010903.

27-0469 Bis(N-t-butyl-N'-ethylpropanimidamido)cobalt(II), min. 98% (99.99%-Co) PURATREM (1011477-51-2) 1g
 $C_{18}H_{38}CoN_4$; FW: 369.45; blue-green liq. 5g
air sensitive, moisture sensitive
 Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

Technical Note:

- See 27-0468 (page 2)

27-0485 Bis(N,N'-di-i-propylacetamidinato)cobalt(II), min. 98% Co(iPr-MeAMD)₂ (635680-58-9) 250mg
 amp $C_{16}H_{34}CoN_4$; FW: 341.40; green xtl.; m.p. 84°; b.p. sublimes 50°C (50 mTorr) 1g
air sensitive, moisture sensitive 5g
 Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

Technical Notes:

- Co amidinate for cobalt metal and cobalt composite thin films.

Target Deposit	Deposition Technique	Delivery Temperature	Pressure	Co-reactants	Deposition Temperature	Ref.
Co	ALD	65 °C	0.3 Torr	H ₂	350 °C	[1, 4]
Co	ALD	65 °C		NH ₃	350 °C	[3, 4]
Co	DLE-CVD	in tetradecane	10 Torr	H ₂ , NH ₃	200 °C	[6]
CoO	ALD	65 °C	0.3 Torr	H ₂ O	250 °C	[1]
CoO	ALD	56 °C		H ₂ O	170-180 °C	[5]
CoN _x	PEALD	50 °C		NH ₃ plasma	80-200 °C	[10]
CoN	DLE-CVD	in tetradecane	10 Torr	NH ₃	200 °C	[6]
Co ₉ S ₈	ALD	60 °C	0.3-0.4 Torr	H ₂ S	80-200 °C	[7, 9]
Co ₉ S ₈	ALD	120 °C		H ₂ S	130-225 °C	[8]

Thermal Behavior:

- Vapor pressure: 0.03 Torr [2] at 40 °C
- TGA available in [2]
- Melting point: 84 °C [1, 2]

References:

- Nat. Mater.* **2003**, 2, 749.
- Dalton Trans.*, **2008**, 2592.
- ECS Trans.* **2009**, 25, 101.
- J. Electrochem. Soc.* **2009**, 157, D10.
- J. Appl. Phys.* **2013**, 114, 084901.
- J. Mater. Chem. C*, **2015**, 3, 12098.
- Nano Lett.* **2015**, 15, 6689.
- ACS Nano*, **2015**, 9, 8484.
- J. Mater. Chem. A*, **2017**, 5, 21353.
- J. Vac. Sci. Tech. A* **2019**, 37, 010904.

27-0486 Bis(N,N'-di-i-propylacetamidinato)cobalt(II), min. 98% (99.99%-Co) PURATREM (Co(iPr-MeAMD)₂ 250mg
 amp (635680-58-9) 1g
 HAZ $C_{16}H_{34}CoN_4$; FW: 341.40; green xtl.; m.p. 84°; b.p. sublimes 50°C (50 mTorr) 5g
air sensitive, moisture sensitive
 Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

Technical Note:

- See 27-0485 (page 3)

29-7100 Bis(N,N'-di-sec-butylacetamidinato)dicopper(I), 99% (695188-31-9)

250mg

amp

(C₁₀H₂₁N₂)₂Cu₂; FW: 465.67; white to off-white xtl.

1g

air sensitive, moisture sensitive, (store cold)

5g

Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

Technical Note:

1. Cu amidinate precursor for ALD and CVD of metals, metal sulfides, and oxides.

Target Deposit	Deposition Technique	Delivery Temperature	Pressure	Co-reactants	Deposition Temperature	Ref.
Cu	ALD	90-100 °C		H ₂	150-190 °C	[2, 3, 5]
Cu	PEALD			H ₂ plasma	50-350 °C	[12]
Cu	CVD	100, 130 °C	5 Torr	H ₂	150-250 °C	[7, 8]
CuMnx	CVD	130 °C	5 Torr	25-0230, H ₂	180 °C	[7]
Cu ₂ O	ALD			H ₂ O	140-225 °C	[14]
Cu ₂ O	CVD	98 °C	1-10 Torr	H ₂ O	125-250 °C	[11, 13]
Cu ₂ S	ALD	110, 160 °C	0.5-10 Torr	H ₂ S	130-135 °C	[4, 6, 11]
Cu ₂ S	CVD	130 °C	10 Torr	H ₂ S	100-200 °C	[10]
CuSbS ₂	ALD	150 °C		Sb(NMe ₂) ₃ , H ₂ S	100 °C	[9]

Thermal Behavior:

- Vapor pressure: 0.1 Torr at 85 °C [1], 0.3 Torr at 130 °C [8]
- TGA available in [1]
- Melting point: 77 °C [1, 2, 8]

References:

1. *Inorg. Chem.* **2005**, 44, 1728.
2. *J. Electrochem. Soc.* **2006**, 153, C787.
3. *J. Am. Chem. Soc.* **2009**, 131, 18159.
4. *Appl. Phys. Lett.* **2009**, 94, 123107.
5. *Mater. Res. Soc. Symp. Proc.* **2009**, 1155, 1106.
6. *Chem. Mater.* **2011**, 23, 4411.
7. *J. Electrochem. Soc.* **2011**, 158, D248.
8. *ECS J. Solid State Sci. Technol.* **2015**, 4, P305.
9. *ACS Appl. Mater. Interfaces* **2017**, 9, 4667.
10. *J. Vac. Sci. Technol. A* **2017**, 35, 01B109.
11. *ACS Appl. Energy Mater.* **2018**, 1, 6953.
12. *Plasma Sci. Technol.* **2018**, 20, 035507.
13. *ACS Appl. Energy Mater.* **2019**, 2, 7750.
14. *ACS Omega* **2019**, 4, 20756.

64-3575 Tris(N,N'-di-i-propylformamidinato)gadolinium(III), (99.999+%-Gd) PURATREM Gd-FMD

1g

C₂₁H₄₅GdN₆; FW: 538.87; white to off-white powdr.

5g

*air sensitive, moisture sensitive*Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

26-0145 Bis(N,N'-di-t-butylacetamidinato)iron (II), min. 98% (635680-56-7)

250mg

amp $C_{20}H_{42}N_4Fe$; FW: 394.42; dark gray solid; m.p. 107°

1g

air sensitive, moisture sensitive

5g

Note: Extremely air-sensitive. Contact Strem to discuss. Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

Technical Notes:

1. Iron amidinate precursor for the deposition of iron containing thin films by ALD and CVD.

Target Deposit	Deposition Technique	Delivery Temperature	Pressure	Co-reactants	Deposition Temperature	Ref.
FeC_xN_y	CVD	85 °C	10 Torr	H_2	150-450 °C	[2, 3]
Fe_2O_3	ALD	120 °C		H_2O	130-200 °C	[4]
FeS_x	ALD	75 °C	0.3 Torr	H_2S	80-300 °C	[5]
FeS_2	PEALD	70 °C		H_2S plasma	80-300 °C	[6]
FeN_x	ALD	85 °C	0.4-0.8 Torr	N_2H_4	215-315 °C	[7]

Thermal Behavior:

- Vapor pressure: 0.06 Torr at 55 °C [1], 0.15 Torr at 75 °C [5]
- TGA available in [1]
- Melting point: 107 °C [1]

References:

1. *Inorg. Chem.* **2003**, 42, 7951.
2. *ECS Trans.* **2009**, 25, 181.
3. *J. Electrochem. Soc.* **2010**, 157, D454.
4. *ACS Appl. Mater. Interfaces* **2015**, 7, 16138.
5. *Angew. Chem. Int. Ed.* **2017**, 56, 1.
6. *Angew. Chem. Int. Ed.* **2018**, 57, 5898.
7. *Chem. Commun.* **2019**, 55, 1943.

57-1200 Tris(N,N'-di-i-propylformamidinato)lanthanum(III), (99.999%-La) PURATREM La-FMD (1034537-36-4)

1g

amp $C_{21}H_{45}LaN_6$; FW: 520.53; white to off-white powdr.

5g

HAZ *air sensitive, moisture sensitive*

Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

Technical Note:

1. ALD/CVD precursor for lanthanum thin film deposition.

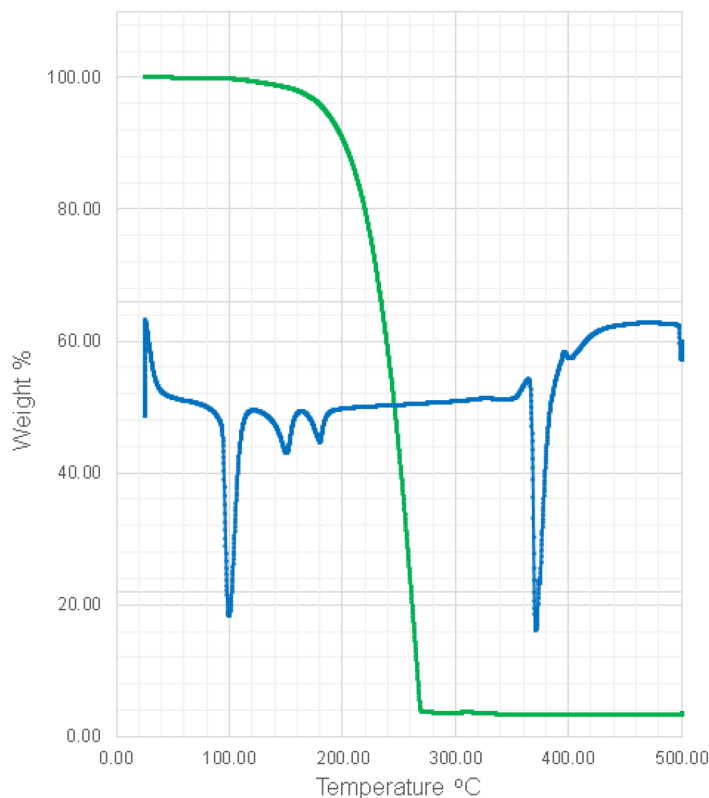
Target Deposit	Deposition Technique	Delivery Temperature	Pressure	Co-reactants	Deposition Temperature	Ref.
$LaAlO_3$	ALD	120 °C	-	TMA, H_2O	300 °C	1
	ALD	130 °C	1 Torr	TMA, H_2O	250 °C	2-3
La_2O_3	ALD	120 °C	-	O_2	300 °C	4
	ALD	135 °C	1-3.5 Torr	O_3	175 °C	5
	ALD	150 °C	0.76 Torr	O_3	250 °C	6
	ALD	-	7.6 Torr	H_2O	250-400 °C	7

Thermal Behavior:

- Vapor pressure 82 mTorr at 120 °C [1]
- TGA (see below)

TGA/DTA for item 57-1200

The sample was ramped from 25°C to 500°C at a rate of 10°C/minute under inert nitrogen purge.



References:

1. *ECS Transactions*, **2008**, 16, 471.
2. *ECS Trans.* **2013**, 54, 255.
3. *J. Cryst. Growth*, **2013**, 363, 150.
4. *Appl. Phys. Lett.* **2009**, 94, 262904.
5. *J. Electrochem. Soc.* **2011**, 158, H447.
6. *ECS Trans.* **2012**, 45, 95.
7. *Appl. Surf. Sci.* **2014**, 292, 880.

57-1500 amp	Tris(N,N'-di-i-propylpentylamidinato)lanthanum(III), 98% (99.999%-La) PURATREM	1g
	$C_{33}H_{69}N_6La$; FW: 688.84; off white to beige solid <i>air sensitive, moisture sensitive</i> Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2 .	5g
03-8000	(N,N'-Di-i-propylacetamidinato)lithium, min. 97% (99.99+%-Li) PURATREM	1g
	$C_8H_{17}N_2Li$; FW: 148.17; off white to beige solid <i>air sensitive, moisture sensitive</i> Note: Sold in collaboration with HepatoChem.	5g
71-1050 amp	Tris(N,N'-di-i-propylacetamidinato)lutetium(III), 99%	250mg
	$Lu(C_8H_{17}N_2)_3$; FW: 598.67; white to off-white powdr. <i>air sensitive, moisture sensitive</i> Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2 .	1g 5g

12-0865	Bis(N-t-butyl-N'-ethylpropanimidamido)magnesium, min. 98% (99.99+%-Li) PURATREM	1g
amp	C ₁₈ H ₃₈ MgN ₄ ; FW: 334.82; off-white to tan solid <i>air sensitive, moisture sensitive</i>	5g
	Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2 .	

12-0845	Bis(N,N'-di-sec-butylacetamidinato)magnesium, 99%	1g
	C ₂₀ H ₄₂ MgN ₄ ; FW: 362.88; colorless to pale yellow liq. <i>light sensitive, moisture sensitive</i>	5g
	Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2 .	

Technical Note:

1. Magnesium amidinate precursor for the atomic layer deposition (ALD) of calcium containing thin films.

Target Deposit	Deposition Technique	Delivery Temperature	Pressure	Co-reactants	Deposition Temperature	Ref.
MgO	ALD	109 °C		H2O	225-275 °C	[1]
Mg _x Ca _{1-x} O	ALD	110 °C		H2O	310 °C	[2, 3]

Thermal Behavior:

- TGA available in [1]
- Distillation at 80 °C, 14 mTorr [1]

References:

1. Proc. AVS ALD **2009**.
2. *Nano Lett.* **2016**, 16, 7650.
3. *J. Mater. Res.* **2020**, 35, 831.

25-0230	Bis(N,N'-di-i-propylpentylamidinato)manganese(II), min. 98% (1188406-04-3)	250mg
amp	C ₂₂ H ₄₆ MnN ₄ ; FW: 421.57; brown solid <i>air sensitive, moisture sensitive</i>	1g
	Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2 .	

Technical Note:

1. Manganese amidinate precursor for the deposition of manganese containing thin films.

Target Deposit	Deposition Technique	Delivery Temperature	Pressure	Co-reactants	Deposition Temperature	Ref.
Mn	CVD	90 °C			200-400 °C	[1]
MnN _x	CVD	90 °C	5 Torr	NH ₃	130 °C	[2]
MnCu _x	CVD	90 °C	5 Torr	29-7100, H ₂	180 °C	[2]

Thermal Behavior:

- Vapor pressure 0.08 Torr at 90 °C [1]
- Melting point 60 °C [1]

References:

1. Proc. Adv. Metallization Conf. **2009**.
2. *J. Electrochem. Soc.* **2011**, 158, D248.
3. *J. Phys. Chem. C*, **2012**, 116, 23585.

28-0045 Bis(N,N'-di-t-butylacetamidinato)nickel(II), (99.999%-Ni) PURATREM (940895-79-4)

250mg

amp $C_{20}H_{42}N_4Ni$; FW: 397.27; dark, purple-black xtl.; m.p. 95-96°

1g

air sensitive, moisture sensitive

5g

Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

Technical Notes:

1. Nickel amidinate precursor for the growth of nickel containing thin films.

Target Deposit	Deposition Technique	Delivery Temperature	Pressure	Co-reactants	Deposition Temperature	Ref.
Ni	AACVD	150 °C in tetradecane	10 Torr	NH ₃ , H ₂	160 °C	[5]
NiO _x	ALD	20-135 °C		H ₂ O	90-250 °C	[2, 9, 11, 12, 14]
NiN _x	AACVD	150 °C in tetralin	1-10 Torr	NH ₃ , H ₂	160-240 °C	[1]
NiS _x	ALD	70-120 °C	0.3-0.6 Torr	H ₂ S	90-300 °C	[3, 4, 8, 10, 13]
NiS	PEALD		0.09 Torr	H ₂ S plasma	80-280 °C	[6]
NiC _x	PEALD	75 °C		H ₂ plasma	75-300 °C	[7]

Thermal Behavior:

- Vapor pressure plot available in [1]; ~140 mTorr at 70 °C [3, 8, 10, 12]
- TGA available in [1]
- Sublimation: 95 °C at 0.05 Torr [1]
- Melting point: 87 °C [1]
- Decomposition at 250 °C in deposition process [12]

References:

1. *Chem. Mater.*, **2010**, 22, 3060.
2. *J. Appl. Phys.* **2014**, 115, 144303.
3. *Chem. Mater.*, **2016**, 28, 1155.
4. *Langmuir* **2016**, 32, 12005.
5. *J. Appl. Phys.* **2017**, 121, 175301.
6. *Angew. Chem. Int. Ed.* **2018**, 57, 5898.
7. *ACS Appl. Mater. Interfaces* **2018**, 10, 8384.
8. *J. Phys. Chem. C* **2018**, 122, 21514.
9. *Langmuir* **2018**, 34, 14143.
10. *Chem. Mater.* **2019**, 31, 445.
11. *Nat. Energy* **2019**, 4, 290.
12. *Chem. Mater.* **2019**, 31, 5172.
13. *J. Mater. Res.* **2020**, 35, 822.
14. *PNAS* **2020**, 117, 12564.

44-0056 Bis(N,N'-di-tert-butylacetamidinato)ruthenium(II) dicarbonyl, 98% (99.99%-Ru) PURATREM (949113-49-9)

1g

amp $C_{22}H_{42}N_4O_2Ru$; FW: 495.67; Beige to yellow solid; m.p. 204

5g

*air sensitive, moisture sensitive*Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

Technical Note:

1. Precursor for the CVD and ALD of ruthenium metal and oxide thin films.

Target Deposit	Deposition Technique	Delivery Temperature	Pressure	Co-reactants	Deposition Temperature	Ref.
Ru	ALD	130 °C		NH ₃	200-300 °C	[1, 2]
Ru	ALD	140 °C	0.3 Torr	O ₂	300-400 °C	[4]
Ru	CVD	130 °C	4.8 Torr	-	200-300 °C	[1]
Ru ₂ O	CVD	140 °C	0.45 Torr	O ₂	280 °C	[5]

Thermal Behavior:

- Vapor pressure 0.055 Torr at 130 °C [3]
- TGA available in [3]
- Sublimation at 130 °C at 55 mTorr [3]
- Melting point: 204 °C [3]

References:

1. *J. Electrochem. Soc.* **2007**, 154, D642.
2. *J. Appl. Phys.* **2007**, 101, 124503.
3. *Open Inorg. Chem. J.* **2008**, 2, 11.
4. *Chem. Vap. Deposition* **2009**, 15, 312.
5. *Cryst. Growth Des.* **2013**, 13, 1316.

21-1200 **Tris(N,N'-di-i-propylformamidinato)scandium(III), (99.9%-Sc)** 1g
 C₂₁H₄₅ScN₆; FW: 426.58; white to off-white powdr. 5g
air sensitive, moisture sensitive
 Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

50-1170 **Bis(N,N'-di-i-propylacetamidinato)tin(II), 99% (1421599-46-3)** 250mg
 amp Sn(C₈H₁₇N₂)₂; FW: 401.18; white xtls. 1g
air sensitive, moisture sensitive 5g
 Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

Technical Note:

1. Precursor for the CVD and ALD of ruthenium metal and oxide thin films.

Target Deposit	Deposition Technique	Delivery Temperature	Pressure	Co-reactants	Deposition Temperature	Ref.
SnS	ALD	95 °C		H ₂ S	100-300 °C	[1, 3]

Thermal Behavior:

- Vapor pressure of 0.64 Torr at 95 °C [1]
- Sublimation at 90 °C and 30 mTorr [1]
- TGA available in [2]

References:

1. *Adv. Eng. Mater.*, **2011**, 1, 1116.
2. *Chem. Mater.* **2014**, 26, 3065.
3. *J. Appl. Phys.* **2017**, 122, 045303.

70-1000 **Tris(N,N'-di-i-propylacetamidinato)ytterbium(III), 99%** 250mg
 Yb(C₈H₁₇N₂)₃; FW: 596.74; white to off-white powdr. 1g
air sensitive, moisture sensitive 5g
 Note: ALD precursor. Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

39-1550 Tris(N,N'-di-i-propylformamidinato)yttrium(III), 97%

1g

amp C₂₁H₄₅N₆Y; FW: 470.53; light beige-yellow solid

5g

*air sensitive, moisture sensitive*Note: Product sold under, use subject to, terms and conditions of label license at www.strem.com/harvard2.

Technical Note:

1. Precursor for the deposition of yttrium oxide thin films.

Target Deposit	Deposition Technique	Delivery Temperature	Pressure	Co-reactants	Deposition Temperature	Ref.
Y ₂ O ₃	ALD	95 °C		H ₂ O	100-325 °C	[1]

Thermal Behavior:

- Vapor pressure curve available in [1]; 1 Torr at 156 °C [1]
- TGA available in [1]

References:

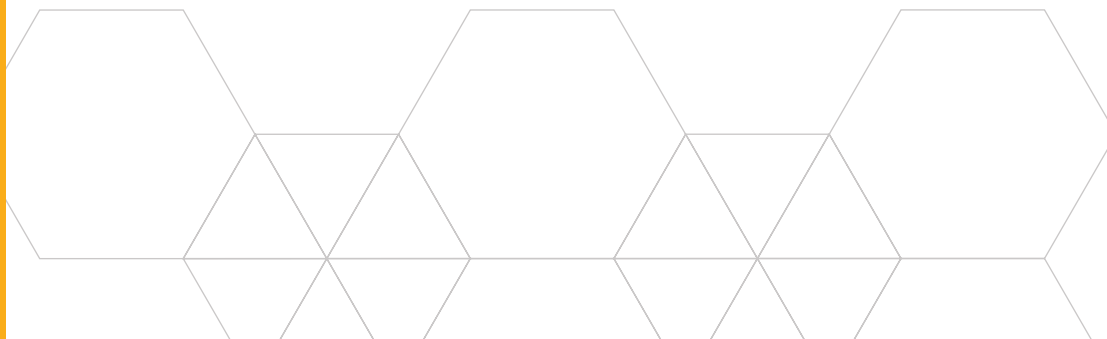
1. *RSC Adv.*, **2021**, 11, 2565.

Additional Product Details

Metal amidinate complexes, with intriguing structural diversity and novel properties, have been the subject of intense investigations in chemistry, electronics, optics, energy, and materials science.^[1-4] Great interest has been focused on the applicability of the complexes as single-source precursors of advanced functional materials.^[5] Metal-based amidinate complexes have been used as volatile precursors for Atomic Layer Deposition of films with novel versatile properties. This allows a wide variety of applications in modern high technology, including semiconductor micro-electronics, high-resolution displays, optical filters, magnetic information storage, and catalysis.^[10-12] The precursors need to be designed in such a way that the compounds are volatile and thermally stable at growth temperatures.^[10,13] Generally, more volatility directly correlates with a better precursor. The synthesis and characterization of numerous metal compounds with amidinate ligands have been reported in the literature.^[10,12-14] The volatility and thermal stability of symmetric amidinates of transition metals and lanthanum with oxidation states of one (Cu, Ag, Au),^[15] two (Mg, Mn, Fe, Co, Ni),^[16] three (Ti, V, Y, Al, Ga, La),^[17] and four (Ru, Hf)^[8] have been reported.

References

1. A. R. Sadique, M. J. Heeg, C. H. Winter, *J. Am. Chem. Soc.* **2003**, 125, 7774-7775.
2. J. R. Hagadorn, J. Arnold, *Angew. Chem. Int. Ed.* **1998**, 37, 1729-1731; *Angew. Chem.* **1998**, 110, 1813-1815.
3. H. Kondo, K. Matsubara, H. Nagashima, *J. Am. Chem. Soc.* **2002**, 124, 534-535.
4. X. Jiang, J. C. Bollinger, M. H. Baik, D. Lee, *Chem. Commun.* **2005**, 8, 1043-1045.
5. J. Barker, N. C. Blacker, P. R. Phillips, N. W. Alcock, W. Errington, M. G. H. Wallbridge, *J. Chem. Soc., Dalton Trans.* **1996**, 431-437.
6. D. Abeysekera, K. N. Robertson, T. S. Cameron, J. A. C. Clyburne, *Organometallics* **2001**, 20, 5532-5536.
7. C. Villiers, P. Thuery, M. Ephritikhine, *Eur. J. Inorg. Chem.* **2004**, 23, 4624-4632.
8. D. A. Kissounko, Y. H. Zhang, M. B. Harney, L. R. Sita, *Adv. Synth. Catal.* **2005**, 347, 426-432.
9. T. Chivers, C. Fedorchuk, M. Parvez, *Organometallics* **2005**, 24, 580-586.
10. B. S. Lim, A. Rahtu, J.-S. Park, R. G. Gordon, *Inorg. Chem.* **2003**, 42, 7951-7958.
11. a) D. Hausmann, J. Becker, S. Wang, R. G. Gordon, *Science* **2002**, 298, 402-406.
b) B. S. Lim, A. Rahtu, R. G. Gordon, *Nat. Mater.* **2003**, 2, 749-754.
12. c) R. G. Gordon, S. Barry, R. N. R. Broomhall-Dillard, D. J. Teff, *Adv. Mater. Optics Electron.* **2000**, 10, 201-211.
13. A. I. Kingon, J. P. Maria, S. K. Streiffer, *Nature* **2000**, 406, 1032-1038.
14. Z. Li, S. T. Barry, R. G. Gordon, *Inorg. Chem.* **2005**, 44, 1728-1735.
15. F. T. Edelmann, D. M. M. Freckmann, H. Schumann, *Chem. Rev.* **2002**, 102, 1851-1896.
16. H. E. Abdou, A. A. Mohamed, J. M. Lopez-de-Luzuriaga, J. P. Fackler, *J. Cluster Sci.* **2004**, 15, 397-411.
a) R. T. Boere, M. L. Cole, P. C. Junk, *New J. Chem.* **2005**, 29, 128-134;
17. b) F. A. Cotton, N. S. Dalal, C. Y. Liu, C. A. Murillo, J. M. North, X. P. Wang, *J. Am. Chem. Soc.* **2003**, 125, 12945-12952.
a) M. J. McNevin, J. R. Hagadorn, *Inorg. Chem.* **2004**, 43, 8547-8554.
b) P. de Rouffignac, J. S. Park, R. G. Gordon, *Chem. Mater.* **2005**, 17, 4808-4814.
c) W. X. Zhang, M. Nishiura, Z. M. Hou, *J. Am. Chem. Soc.* **2005**, 127, 16788-16789.
d) M. L. Cole, C. Jones, P. C. Junk, M. Kloth, A. Stasch, *Chem. Eur. J.* **2005**, 11, 4482-4491.





Headquartered in Bellevue, WA, **Ascensus Specialties is the global leader in catalysts, ligands, building blocks, and specialty reagents.** Our 60+ years of synthetic knowhow, allows us to bring additional value to our clients through our custom synthesis and cGMP services. From world-class production plants in Elma, WA, Evans City, PA, Newburyport, MA, and Cambridge, UK, Ascensus has a global reach that ensures our clients can consistently manufacture their products to the highest standards.

THE ASCENSUS ADVANTAGE

60+ Years Of Experience

Custom-Tailored Purity And Impurity Profiles

Commercial GMP Capabilities

Supply Chain Development

Process Control And Robustness

Bioburden Control



CONTACT

P +1 · 424 · 448 · 1679

E ask@ascensuspecialties.com

U www.ascensuspecialties.com



COPORATE OFFICE

Ascensus Specialties

2821 Northup Way, Suite 275

Bellevue, WA 98004



MANUFACTURING FACILITIES

4800 State Route 12

Elma, WA 98541

1424 Mars-Evans City Rd
Evans City, PA 16033

7 Mulliken Way
Newburyport, MA 01950

Haverhill Road,
Stradishall Newmarket
Suffolk, CB8 9EX