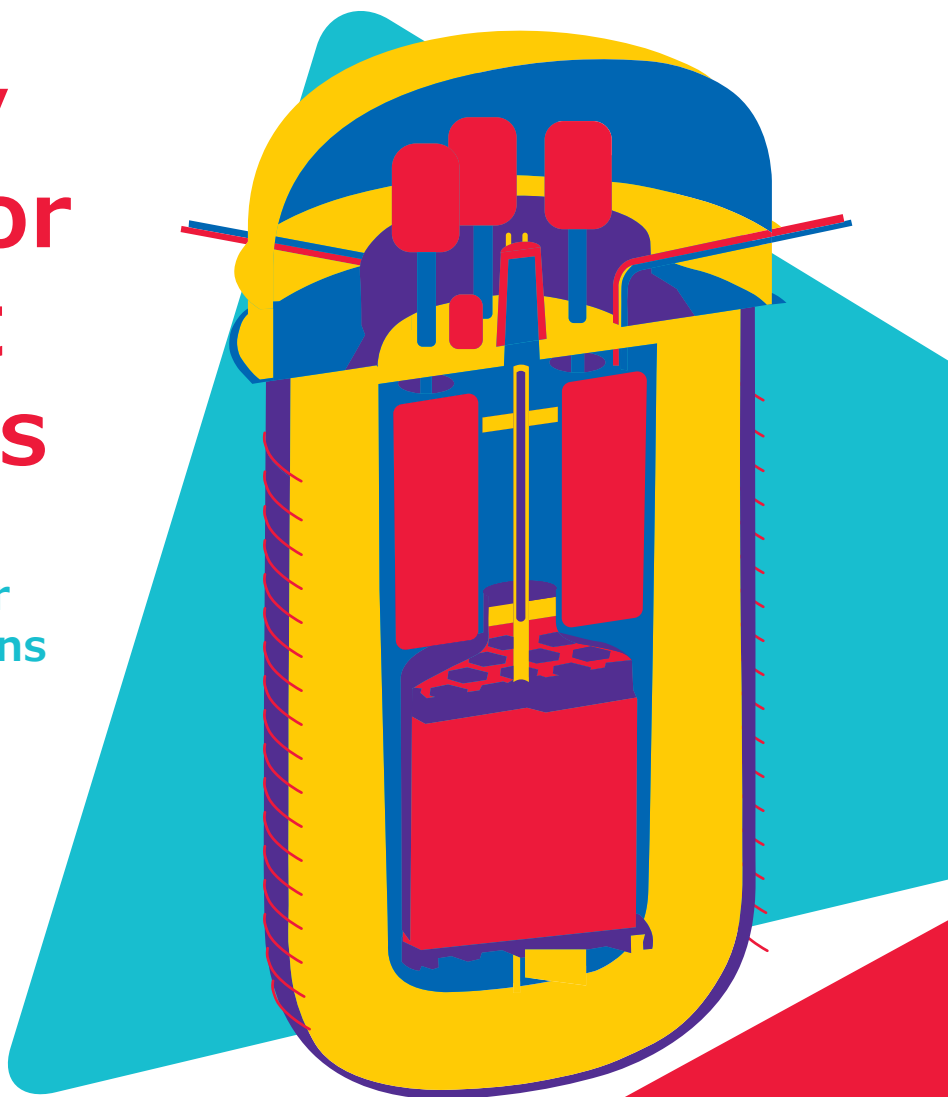
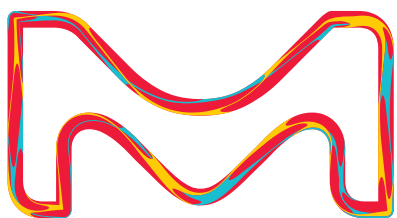


High-Purity Materials for Molten Salt Applications

Material Innovations for
Scalable Energy Solutions



MilliporeSigma is
the U.S. and Canada
Life Science business
of Merck KGaA,
Darmstadt, Germany.

Sigma-Aldrich®
Lab & Production Materials

Molten salts possess high heat capacity, low viscosity, high density, exceptional electrochemical stability, and outstanding heat conductivity. Moreover, they boast high electrical conductivity and cost-effectiveness, making them an ideal medium for chemical reactions, energy transfer, and storage. For example, molten salt reactors represent a promising technology with increased efficiency and lower waste generation. By operating at low pressure, these reactors mitigate the risk of accidents and bolster safety. Additionally, they utilize fluid fuel in the form of halide salts, serving as both fuel and coolant.

Features & Benefits

- Trace metal purity of 99.9% (3N) to 99.999% (5N),
- Low impurities of metals such as Be, Ca, K, Li, Pb, Zn, Cd etc.
- Beaded salts with a low water content of parts per million
- Low oxygen content measured by infrared combustion analysis on selected products
- Anhydrobeads™ salts are monodisperse and free-flowing for easy handling
- A wide variety of halide and nitrate salts are available

Molten salts also find utility in other thermal energy storage applications, including **solar thermal storage**, **nuclear energy storage**, **metal salt batteries**, and **electrochemical electrolysis**.

We offer a wide range of high-purity, low moisture salts in both powdered and beaded (ANHYDROBEADS™) forms, with trace metal purities ranging from 99.9% to 99.999% as measured by ICP-MS or coupled ICP-OES.

To find out more about our high purity salts, visit SigmaAldrich.com/moltenalts



We can support you with:

- Custom trace metal analysis up to 68 elements
- In-house water content method development and testing capabilities (*case-by-case basis)
- In-house oxygen content method development and testing capabilities (*case-by-case basis)
- Custom manufacturing of salts (especially eutectic and ternary salts)
- Scale up manufacturing capacities

We provide different product lines such as ACS, Redi Dri™, Anhydrobeads™ and Trace Metals Basis

Product Line	Description
AnhydroBeads™	• Trace Metal Purity: Exceptional purity ranging from 99.9% (3N) to 99.999% (5N) trace metal basis. • Thorough Testing: Products undergo rigorous specification testing using ICP-OES or ICP-MS to ensure high quality and performance. • Quality: Proprietary monodisperse, ultra-free-flowing beads with a low surface area-to-volume ratio of approximately 2 mm in diameter. • Versatility: Ideal for air and moisture-sensitive applications. • AnhydroBeads™ is a trademark of Sigma-Aldrich Co. LLC.
Trace Metals Basis	• Comprehensive Testing: Products undergo rigorous testing using ICP-OES or ICP-MS to ensure top-quality standards and performance. • Trace Metal Purity: Feature exceptional trace metal purity levels of 99.9% (3N) to 99.999% (5N). • Versatility: Ideal for a wide range of applications where purity is paramount.
Anhydrous	• Anhydrous: Salts are in anhydrous form (low moisture content). • Moisture Content: Select products contain moisture content data (if available, found in the Certificate of Analysis - COA) • Purity: Varying purity levels, ranging from 99.9% (3N) to 99.999% (5N) on a trace metals basis or ACS grade. • Adaptability: Ideal for air and moisture-sensitive applications.
Redi-Dri™	• Advanced Packaging: Stored and shipped in innovative packaging designed to prevent the absorption of environmental moisture by anhydrous and hygroscopic salts, ensuring product integrity and performance. • Purity Options: Applicable to all purity levels, from trace metals to ACS grade/reagent grade, tailored to meet diverse application requirements. • Adaptability: Ideal for air- and moisture-sensitive applications. • Redi-Dri™ is a trademark of Sigma-Aldrich Co. LLC
ACS Grade	Specifications set by the American Chemical Society (ACS) with a purity of ≥95%

Custom Product Examples

Sodium chloride

Assay (ICP-MS)	99.999% trace metals basis
Impurities	≤15.0 ppm trace metal analysis
Moisture level (ppmw)	1.548
Oxygen (ppmw)	14

Iron(II) chloride

Assay (ICP-MS)	99.9% trace metals basis
Impurities	≤1500.0 ppm trace metal analysis
Moisture level (ppmw)	3.58
Oxygen (ppmw)	23.7

Metal Chlorides

Name	Specifications	Compositions	Trace Metal Analysis	Cat. No.
Aluminum chloride	anhydrous, powder, 99.99% trace metals basis	AlCl ₃	≤150.0 ppm	449598
	anhydrous, powder, 99.999% trace metals basis	AlCl ₃	≤15.0 ppm	563919
Barium chloride	AnhydroBeads™, –10 mesh, 99.999% trace metals basis	BaCl ₂	≤15.0 ppm	449644
	AnhydroBeads™, –10 mesh, 99.95% trace metals basis	BaCl ₂	≤550.0 ppm	449652
Chromium(II) chloride	AnhydroBeads™, –10 mesh, 99.99% trace metals basis	CrCl ₂	≤150.0 ppm	762873
Calcium chloride	AnhydroBeads™, –10 mesh, ≥99.99% trace metals basis	CaCl ₂	≤100.0 ppm	429759
	anhydrous, powder, 99.99% trace metals basis	CaCl ₂	≤150.0 ppm	499609
Cesium chloride	AnhydroBeads™, –10 mesh, 99.999% trace metals basis	CsCl	< 15 ppm	449733
	≥99.999% trace metals basis	CsCl	< 10 ppm	203025
Chromium(III) chloride	anhydrous, 99.99% trace metals basis	CrCl ₃	≤150.0 ppm	450790
Cobalt(II) chloride	AnhydroBeads™, –10 mesh, 99.9% trace metals basis	CoCl ₂	≤1500.0 ppm	449776
	AnhydroBeads™, –10 mesh, 99.995% trace metals basis	CoCl ₂	≤15.0 ppm	409332
Copper(I) chloride	AnhydroBeads™, ≥99.99% trace metals basis	CuCl	≤100.0 ppm	651745
Copper(II) chloride	anhydrous, powder, ≥99.995% trace metals basis	CuCl ₂	≤50.0 ppm	451665
Iron(II) chloride	AnhydroBeads™, –10 mesh, 99.9% trace metals basis	FeCl ₂	≤1500.0 ppm	450944
	AnhydroBeads™, –10 mesh, 99.99% trace metals basis	FeCl ₂	≤150.0 ppm	450936
Iron(III) chloride	anhydrous, powder, ≥99.99% trace metals basis	FeCl ₃	≤100.0 ppm	451649
Lithium chloride	AnhydroBeads™, –10 mesh, 99.998% trace metals basis	LiCl	≤ 25.0 ppm	429457
	AnhydroBeads™, –10 mesh, ≥99.9% trace metals basis	LiCl	≤ 1000.0 ppm	449881
Magnesium chloride	AnhydroBeads™, –10 mesh, 99.9% trace metals basis	MgCl ₂	≤ 1500.0 ppm	449164
Manganese(II) chloride	AnhydroBeads™, –10 mesh, 99.99% trace metals basis	MnCl ₂	≤150.0 ppm	429449
	AnhydroBeads™, –10 mesh, 99.999% trace metals basis	MnCl ₂	≤15.0 ppm	450995
Nickel(II) chloride	anhydrous, powder, 99.99% trace metals basis	NiCl ₂	≤150.0 ppm	451193
Potassium chloride	AnhydroBeads™, –10 mesh, 99.999% trace metals basis	KCl	< 15 ppm	449989
	AnhydroBeads™, –10 mesh, 99.99% trace metals basis	KCl	≤ 150.0 ppm	451029
Rubidium chloride	99.8% trace metals basis	RbCl	≤2500.0 ppm	215260
Rubidium chloride	99.95% trace metals basis	RbCl	≤550.0 ppm	204250
Sodium chloride	AnhydroBeads™, –10 mesh, 99.999% trace metals basis	NaCl	< 15 ppm	450006
Strontium chloride	anhydrous, powder, ≥99.99% trace metals basis	SrCl ₂	≤100.0 ppm	439665
Zinc chloride	AnhydroBeads™, amorphous, –10 mesh, 99.999% trace metals basis	ZnCl ₂	≤15.0 ppm	456845
Zinc chloride	anhydrous, powder, ≥99.995% trace metals basis	ZnCl ₂	≤50.0 ppm	429430

Metal Fluorides

Name	Specifications	Compositions	Trace Metal Analysis	Cat. No.
Aluminum fluoride	anhydrous, powder, 99.8% trace metals basis	AlF ₃	≤1,000.0 ppm	449628
Antimony(III) fluoride	powder, 99.8% trace metals basis	SbF ₃	≤2500.0 ppm	381292
Barium fluoride	99.99% trace metals basis	BaF ₂	≤150.0 ppm	202746
Bismuth(III) fluoride	≥99.99% trace metals basis	BiF ₃	≤100.0 ppm	401528
Calcium fluoride	anhydrous, powder, 99.99% trace metals basis	CaF ₂	≤150.0 ppm	449717
Cerium(III) fluoride	anhydrous, powder, 99.99% trace metals basis	CeF ₃	≤150.0 ppm	229555
Cesium fluoride	99.99% trace metals basis	CsF	≤ 150.0 ppm	255718
Indium(III) fluoride	≥99.9% trace metals basis	InF ₃	≤1000.0 ppm	435848
Lithium fluoride	≥99.99% trace metals basis	LiF	≤100.0 ppm	449903
	powder, <100 µm, ≥99.98% trace metals basis	LiF	≤200.0 ppm	203645
	Precipitated, 99.995%	LiF	≤55.0 ppm	669431
Manganese(II) fluoride	≥99.95% trace metals basis	MgF ₂	< 500.0 ppm	771619
Potassium fluoride	anhydrous, powder, ≥99.9% trace metals basis	KF	< 1000.0 ppm	449148
Rubidium fluoride	99.8% trace metals basis	RbF	< 2500 ppm	251429
Scandium(III) fluoride	anhydrous, powder, 99.99% trace metals basis	ScF ₃	≤200.0 ppm	432105
Sodium fluoride	anhydrous, powder, 99.99% trace metals basis	NaF	≤150.0 ppm	450022
	99.99% trace metals basis	NaF	≤150.0 ppm	215309
Strontium fluoride	anhydrous, powder, 99.9% trace metals basis	SrF ₂	≤1500.0 ppm	450030
Zirconium(IV) fluoride	99.9% trace metals basis	ZrF ₄	≤1500.0 ppm	311464

Metal Iodides

Name	Specifications	Compositions	Trace Metal Analysis	Cat. No.
Aluminum iodide	anhydrous, powder, 99.999% trace metals basis	AlI ₃	≤15.0 ppm	409324
Barium iodide	AnhydroBeads™, –10 mesh, 99.995% trace metals basis	BaI ₂	≤55.0 ppm	413615
Calcium iodide	AnhydroBeads™, –10 mesh, 99.999% trace metals basis	CaI ₂	≤15.0 ppm	439797
Strontium iodide	anhydrous, ≥99.99% trace metals basis	SrI ₂	≤100.0 ppm	466336
	99.999% trace metals basis	CsI	≤15.0 ppm	203033
Cesium iodide	AnhydroBeads™, 99.999% trace metals basis, (Perovskite grade)	CsI	≤15.0 ppm	914819
	AnhydroBeads™, –10 mesh, 99.999% trace metals basis	CsI	≤15.0 ppm	429384
	anhydrous, 99.995% trace metals basis	CuI	≤55.0 ppm	792063
Copper(I) iodide	99.999% trace metals basis	CuI	≤15.0 ppm	215554
	AnhydroBeads™, –10 mesh, 99.99% trace metals basis	LiI	≤150.0 ppm	439746
Lithium iodide	AnhydroBeads™, –10 mesh, 99.999% trace metals basis	LiI	≤15.0 ppm	450952
	99.9% trace metals basis	LiI	≤1500.0 ppm	518018
Magnesium iodide	98%	MgI ₂	NA	394599
Manganese(II) iodide	anhydrous, 99.99% trace metals basis	MnI ₂	≤150.0 ppm	439738
Nickel(II) iodide	Powder	NiI ₂	NA	400777
Potassium iodide	AnhydroBeads™, –10 mesh, 99.998% trace metals basis	KI	≤ 25.0 ppm	429422
Rubidium iodide	99.9% trace metals basis	RbI	≤1500.0 ppm	251445
Sodium iodide	AnhydroBeads™, –10 mesh, 99.999% trace metals basis	NaI	≤15.0 ppm	439681
	99.999% trace metals basis	NaI	≤15.0 ppm	409286

Rare earth halides

Name	Specifications	Compositions	Trace Metal Analysis	Cat. No.
Cerium(III) fluoride	anhydrous, powder, 99.99% trace metals basis	CeF ₃	≤150.0 ppm	229555
Cerium(III) iodide	AnhydroBeads™, –10 mesh, 99.99% trace metals basis	CeI ₃	≤150.0 ppm	466085
Cerium(III) chloride	AnhydroBeads™, –10 mesh, ≥99.99% trace metals basis	CeCl ₃	≤100.0 ppm	429406
Dysprosium(III) chloride	anhydrous, powder, 99.99% trace metals basis	DyCl ₃	≤150.0 ppm	325546
Dysprosium(III) fluoride	anhydrous, powder, ≥99.98% trace rare earth metals basis	DyCl ₃	<100 ppm	450847
Europium(II) chloride	99.99% trace metals basis	EuCl ₂	≤150.0 ppm	431850
Europium(II) iodide	anhydrous, powder, 99.9% trace metals basis	EuI ₂	≤1500.0 ppm	474770
Erbium(III) chloride	anhydrous, powder, 99.9% trace metals basis	ErCl ₃	≤1500.0 ppm	449792
Europium(III) chloride	anhydrous, powder, 99.99% trace metals basis	EuCl ₃	≤150.0 ppm	429732
Gadolinium(III) chloride	anhydrous, powder, 99.99% trace metals basis	GdCl ₃	≤150.0 ppm	439770
Holmium(III) chloride	anhydrous, powder, 99.9% trace metals basis	HoCl ₃	≤1500.0 ppm	450901
Lanthanum(III) chloride	AnhydroBeads™, –10 mesh, ≥99.99% trace metals basis	LaCl ₃	≤100.0 ppm	449830
	AnhydroBeads™, –10 mesh, 99.9% trace metals basis	LaCl ₃	≤1500.0 ppm	298182
Lanthanum(III) fluoride	anhydrous, powder, 99.99% trace metals basis	LaF ₃	≤150.0 ppm	449857
Lanthanum(III) iodide	AnhydroBeads™, –10 mesh, 99.9% trace metals basis	LaI ₃	≤1500.0 ppm	413674
Neodymium(III) chloride	anhydrous, powder, ≥99.99% trace metals basis	NdCl ₃	≤100.0 ppm	449946
Neodymium(III) fluoride	anhydrous, powder, 99.99% trace metals basis	NdF ₃	≤150.0 ppm	449954
Praseodymium(III) chloride	anhydrous, powder, 99.99% trace metals basis	PrCl ₃	≤150.0 ppm	298298
Samarium(II) iodide	anhydrous, powder, ≥99.9% trace metals basis	SmI ₂	≤1000.0 ppm	409340
Samarium(III) chloride	anhydrous, powder, 99.9% trace rare earth metals basis	SmCl ₃	≤1500.0 ppm	400610
Terbium(III) chloride	anhydrous, powder, 99.99% trace metals basis	TbCl ₃	≤150.0 ppm	451304
	anhydrous, powder, 99.9% trace metals basis	TbCl ₃	≤1500.0 ppm	439657
Ytterbium(II) iodide	powder, ≥99.9% trace metals basis	YbI ₂	≤1000.0 ppm	494372
Ytterbium(III) chloride	AnhydroBeads™, –10 mesh, 99.99% trace metals basis	YbCl ₃	≤150.0 ppm	450073
Ytterbium(III) fluoride	anhydrous, powder, 99.98% trace metals basis	YbF ₃	≤250.0 ppm	432121
Ytterbium(III) chloride	anhydrous, powder, 99.9%	YbCl ₃	≤1500.0 ppm	439614

Metal Nitrates

Name	Specifications	Compositions	Trace Metal Analysis	Cat. No.
Barium nitrate	99.999% trace metals basis	BaNO ₃	≤15 ppm	202754
Cesium nitrate	99.999% trace metals basis	CsNO ₃	≤15 ppm	203041
	99.99% trace metals basis	CsNO ₃	≤150.0 ppm	202150
Lithium nitrate	anhydrous, 99.999% trace metals basis	LiNO ₃	≤15 ppm	930938
	anhydrous, ≥99.9% trace metals basis	LiNO ₃	≤1000 ppm	930946
Potassium nitrate	99.999% trace metals basis	KNO ₃	≤15.0 ppm	542040
	99.99% trace metals basis	KNO ₃	≤150.0 ppm	204110
Rubidium nitrate	99.95% trace metals basis	RbNO ₃	≤550.0 ppm	204269
Silver nitrate	anhydrous, ≥99.999% trace metals basis	AgNO ₃	≤10.0 ppm	792276
	99.9999% trace metals basis	AgNO ₃	≤1.5 ppm	204390
Strontium nitrate	99.995% trace metals basis	SrNO ₃	≤55.0 ppm	204498
Thallium(I) nitrate	99.9% trace metals basis	TlNO ₃	≤1500.0 ppm	309230

Eutectic Salts

Name	Specifications	Compositions	Trace Metal Analysis	Cat. No.
Cesium chloride/sodium chloride (2:1) eutectic	AnhydroBeads™, 99.99% trace metals basis	2CsCl/NaCl	≤150.0 ppm	555282
Lithium chloride/potassium chloride eutectic	AnhydroBeads™, 99.99% trace metals basis	LiCl/KCl	≤150.0 ppm	479330

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