

# Specialty **Silver** Compounds

- Selection of silver compounds can be manufactured up to a purity of 99.999%
- Batch production capability from grams to 200 Kg

107.868  
47  
[Kr] 4d<sup>10</sup> 5s<sup>1</sup>  
mp: 961.8°C  
d: 10.5 g/cc  
Silver

## **Alfa Aesar**<sup>®</sup>

*A Johnson Matthey Company*

[www.alfa.com](http://www.alfa.com)

**Alfa Aesar has longstanding experience in producing an extensive range of specialized silver compounds manufactured in our Royston, UK plant.**

**We have the capability of producing batch sizes up to 200 Kg. Bulk packing sizes are customized to meet our customers' requirements.**

**Many silver compounds are photosensitive. All our specialized silver compounds are packaged in lightproof containers.**

### **KEY FEATURES**

- A batch specific certificate of analysis is produced for each product.
- Each silver product batch has;
  1. Full metallic impurities typically measured by ICP-MS to ppm.
  2. The silver content measured.
- A selection of silver compounds can be manufactured up to a purity of 99.999%
- Most other silver products are manufactured to 99.9% purity as standard.

### **Specialized Silver Compounds**

- Our specialized silver compounds are available in catalog sizes to bulk quantities.
- We can manufacture our silver compounds to specific purity on request.
- If you require a specialized silver compound not listed we can discuss its manufacture.

### **Manufacturing**

Alfa Aesar's production operations offer a single source for silver salts from research to pilot plant scale. Full-scale production of these products is available through our production plant at Royston UK.

### **Development**

With our extensive development capability, we are able to supply advanced silver materials to meet your technical requirements.

### **Quality Control**

We employ advanced quality control for both in-process and final product testing phases. The high standard of our modern quality control and assurance facilities is matched by the expertise of our experienced staff.

Further details and prices for catalog quantities are available in the Alfa Aesar Catalog or via the web site [www.alfa.com](http://www.alfa.com). For larger enquiries contact the Alfa Aesar Specialty Sales Department.







### *Fuel cells & Solar energy materials*

Silver salts are in use in a variety of electrochemical applications, such as fuel cells, in which they exhibit ionic conductivity.

### *Electrodes for potentiometric measurement*

For potentiometric measurement, electrochemists will use a silver/silver chloride electrode as a matter of choice.

### *Photographic film industry*

Silver compounds have been historically used in photography. The silver products used are light-sensitive and undergo fast photoinduced chemical reduction to metallic silver particles.

### *Glass industry:- Cement and coloring agents*

Stained glass can be tinted yellow with silver nitrate. Whereas silver chloride is widely employed as a transparent cement in glass-to-metal seals, for example as a sealant in cathode ray tubes.

### *Seed clouds to produce rain*

Many countries have used cloud seeding with silver iodide to induce rainfall to ease drought conditions.

### *Other uses*

Applications of silver salts include use as a scrubber to remove CO<sub>2</sub> gas and electrodes in watch batteries.



## **Applications of Silver Compounds**

Silver compounds from Alfa Aesar are used in a multitude of applications, ranging from pharmaceutical and chemical to energy, medical and many more.

### *Chemical*

Many silver salts are the chemical precursors for other silver compounds or metallic silver.

### *Laboratory Reagent*

Silver carbonate has been employed in the Koenigs-Knorr reaction, a substitution reaction of a glycosyl halide with an alcohol to give a glycoside. Alternatively, the reaction can be promoted with either various heavy metal salts or other silver salts, including silver triflate. Whilst the decarboxylation of silver carboxylates leads to corresponding carboxylic acid (Hunsdiecker reaction).

### *Pharmaceutical*

The medicinal properties of silver salts have been used in a range of pharmaceutical compositions. Among its biological uses in histology, silver nitrate will demonstrate the presence of proteins and nucleic acids.

### *Medical & Medical devices*

Silver and silver salts have been used extensively throughout history for a variety of medical purposes. Recently silver salts have been incorporated into sterile dressings.

Alfa Aesar produces a range of high purity silver materials. The following is a listing of our standard silver product range. If you require a specialized compound not listed below, Alfa Aesar can also manufacture to meet custom specification, so please contact us.

Stock#	CAS No.	Description	Form	Formula
39306	7784-03-4	Mercury(II) silver iodide	Powder	$\text{Ag}_2\text{HgI}_4$
11660	563-63-3	Silver acetate, anhydrous, 99%	Crystalline	$\text{AgOOCCH}_3$
44228	13510-44-6	Silver arsenate, 99.99% (metals basis)	Powder	$\text{Ag}_3\text{AsO}_4$
45494	2489-05-6	Silver behenate	Powder	$\text{AgO}_2\text{C}(\text{CH}_2)_{20}\text{CH}_3$
11896	532-31-0	Silver benzoate hydrate	Powder	$\text{C}_6\text{H}_5\text{CO}_2\text{Ag}\cdot x\text{H}_2\text{O}$
39649	7783-89-3	Silver bromate, 95%	Powder	$\text{AgBrO}_3$
11425	7785-23-1	Silver bromide, 99.9%	Powder	$\text{AgBr}$
12110	7785-23-1	Silver bromide, Premion®, 99.999% (metals basis)	Crystalline	$\text{AgBr}$
11420	534-16-7	Silver carbonate, 99.5% (metals basis)	Powder	$\text{Ag}_2\text{CO}_3$
18202	534-16-7	Silver carbonate on Celite, ~0.9 mmole $\text{Ag}_2\text{CO}_3$ /g reagent	Powder	
87342	7783-90-6	Silver(I) chloride, 95%	Powder	$\text{AgCl}$
11421	7783-90-6	Silver(I) chloride, 99.9% (metals basis)	Crystalline	$\text{AgCl}$
35715	7783-90-6	Silver(I) chloride, ultra dry, 99.997% (metals basis), Ampouled under argon	-10 Mesh Beads	$\text{AgCl}$
10857	7783-90-6	Silver(I) chloride, Premion®, 99.998% (metals basis)	Powder	$\text{AgCl}$
40107	7784-01-2	Silver(I) chromate, 99% min	Powder	$\text{Ag}_2\text{CrO}_4$
45495	7784-01-2	Silver(I) chromate, 99.9%	Powder	$\text{Ag}_2\text{CrO}_4$
45496	126-45-4	Silver citrate	Powder	$\text{Ag}_3\text{C}_6\text{H}_5\text{O}_7\cdot x\text{H}_2\text{O}$
11424	506-64-9	Silver cyanide, 99%	Powder	$\text{AgCN}$
43708	62638-04-4	Silver cyclohexanecarboxylate	Powder	$\text{C}_{10}\text{H}_{17}\text{AgO}_2$
B22613	62638-04-4	Silver cyclohexanecarboxylate, 99% (dry wt.)	Powder	$\text{C}_{10}\text{H}_{17}\text{AgO}_2$
11898	1470-61-7	Silver diethyldithiocarbamate, ACS	Powder	$\text{C}_5\text{H}_{10}\text{AgNS}_2$
11609	7775-41-9	Silver(I) fluoride, 98%	Crystalline	$\text{AgF}$
11610	7783-95-1	Silver(II) fluoride, 98% min	Crystalline	$\text{AgF}_2$
L16853	3794-64-7	Silver heptafluorobutyrate, 97%	Powder	$\text{C}_4\text{AgF}_6\text{O}_2$
11538	26042-64-8	Silver hexafluoroantimonate(V), 99%	Powder	$\text{AgSbF}_6$
11608	12005-82-2	Silver hexafluoroarsenate(V), 98.5%	Powder	$\text{AgAsF}_6$
11873	26042-63-7	Silver hexafluorophosphate(V), 98%	Powder	$\text{AgPF}_6$
40129	12249-52-4	Silver hydrogen fluoride, 99% min	Crystalline	$\text{AgHF}_2$
40109	7783-97-3	Silver iodate, 99%	Powder	$\text{AgIO}_3$
11419	7783-96-2	Silver iodide, 99.9% (metals basis)	Crystalline	$\text{AgI}$
12111	7783-96-2	Silver iodide, Premion®, 99.999% (metals basis)	Powder	$\text{AgI}$
20835	128-00-7	Silver lactate	Powder	$\text{CH}_3\text{CH}(\text{OH})\text{CO}_2\text{Ag}$
44858	128-00-7	Silver lactate solution, Ag 4-5% w/w (cont. Ag)	Liquid	$\text{CH}_3\text{CH}(\text{OH})\text{CO}_2\text{Ag}$
44828	13497-94-4	Silver metavanadate	Powder	$\text{AgVO}_3$
18641	2386-52-9	Silver methanesulfonate	Powder	$\text{Ag}(\text{SO}_3\text{CH}_3)$
39650	13765-74-7	Silver molybdenum oxide, 99%	Powder	$\text{Ag}_2\text{MoO}_4$
11414	7761-88-8	Silver nitrate, ACS, 99.9+% (metals basis)	Crystalline	$\text{AgNO}_3$
44122	7761-88-8	Silver nitrate, ultra dry, 99.9+% (metals basis), Ampouled under argon	Lumps	$\text{AgNO}_3$

Stock#	CAS No.	Description	Form	Formula
43087	7761-88-8	Silver nitrate, Premion®, 99.995% (metals basis), Ag 63% min	Crystalline	AgNO <sub>3</sub>
10858	7761-88-8	Silver nitrate, Premion®, 99.9995% (metals basis)	Powder	AgNO <sub>3</sub>
35601	7761-88-8	Silver nitrate, 0.1N Standardized Solution	Liquid	AgNO <sub>3</sub>
35597	7761-88-8	Silver nitrate, 1.0N Standardized Solution	Liquid	AgNO <sub>3</sub>
88614	7761-88-8	Silver nitrate, Acculute Standard Volumetric Solution, Final Concentration 0.1N	Liquid	AgNO <sub>3</sub>
88615	7761-88-8	Silver nitrate, Acculute Standard Volumetric Solution, Final Concentration 0.282N	Liquid	AgNO <sub>3</sub>
11418	7783-99-5	Silver nitrite, 99% (metals basis)	Crystalline	AgNO <sub>2</sub>
43268	20667-12-3	Silver(I) oxide, Electrical Grade	Powder	Ag <sub>2</sub> O
11407	20667-12-3	Silver(I) oxide, 99+% (metals basis)	Powder	Ag <sub>2</sub> O
42577	20667-12-3	Silver(I) oxide, 99.99% (metals basis)	Powder	Ag <sub>2</sub> O
22695	1301-96-8	Silver(II) oxide, 98%	Powder	AgO
40187	1301-96-8	Silver(II) oxide, 99.9% (metals basis), Ag 86.6% min	Powder	AgO
L17502	14242-05-8	Silver(I) perchlorate monohydrate, 98%	Crystalline	AgClO <sub>4</sub> ·H <sub>2</sub> O
11624	14242-05-8	Silver(I) perchlorate monohydrate, 99.9% (metals basis)	Crystalline	AgClO <sub>4</sub> ·H <sub>2</sub> O
42209	7783-93-9	Silver(I) perchlorate, anhydrous	Crystalline	AgClO <sub>4</sub>
44480	20655-56-2	Silver(I) perrhenate, 99.99% (metals basis)	Powder	AgReO <sub>4</sub>
11415	7784-09-0	Silver phosphate (ortho), 99%	Powder	Ag <sub>3</sub> PO <sub>4</sub>
12551	506-61-6	Silver potassium cyanide, 99.9% (metals basis), Ag 54.2%	Powder	KAg(CN) <sub>2</sub>
41880	12041-40-6	Silver potassium iodide	Pieces	KAg <sub>4</sub> I <sub>5</sub>
43970	9015-51-4	Silver protein for histology, strong	Powder	
18585	528-93-8	Silver salicylate hydrate	Powder	C <sub>7</sub> H <sub>5</sub> AgO <sub>3</sub> ·xH <sub>2</sub> O
43003	3507-99-1	Silver stearate	Powder	C <sub>18</sub> H <sub>35</sub> AgO <sub>2</sub>
11417	10294-26-5	Silver sulfate, ACS, 98%	Powder	Ag <sub>2</sub> SO <sub>4</sub>
41443	10294-26-5	Silver sulfate Premion®, 99.99% (metals basis) Ag 68.9% min	Powder	Ag <sub>2</sub> SO <sub>4</sub>
12112	3507-99-1	Silver sulfate, Premion®, 99.999% (metals basis)	Powder	Ag <sub>2</sub> SO <sub>4</sub>
11416	21548-73-2	Silver(I) sulfide, 99%	Powder	Ag <sub>2</sub> S
89473	21548-73-2	Silver(I) sulfide, 99.9+% (metals basis)	Crystalline	Ag <sub>2</sub> S
12113	21548-73-2	Silver(I) sulfide, Premion®, 99.998% (metals basis)	Powder	Ag <sub>2</sub> S
45458	21548-73-2	Silver(I) sulfide, 99.999% (metals basis)	Pieces	Ag <sub>2</sub> S
B23358	13465-98-0	Silver(I) sulfite, 99.9%	Powder	Ag <sub>2</sub> SO <sub>3</sub>
11539	14104-20-2	Silver tetrafluoroborate, 99%	Crystalline	AgBF <sub>4</sub>
11897	1701-93-5	Silver thiocyanate	Crystalline	AgSCN
L00307	16836-95-6	Silver(I) p-toluenesulfonate, 98+%	Crystalline	C <sub>7</sub> H <sub>7</sub> AgO <sub>3</sub> S
13933	2966-50-9	Silver(I) trifluoroacetate, 98%	Powder	AgOOCF <sub>3</sub>
88722	2923-28-6	Silver trifluoromethanesulfonate, 98%	Crystalline	AgOSO <sub>2</sub> CF <sub>3</sub>
39661	13465-93-5	Silver tungsten oxide, 99%	Powder	Ag <sub>2</sub> WO <sub>4</sub>

## Properties and Applications of Principle Specialized Silver Compounds

Product	Formula	CAS No.	FW	Density	MP (°C)
Silver acetate	$\text{AgOOCCH}_3$	563-63-3	166.92	3.26	dec
<i>As a catalyst for cycloadditions of isocyanoacetates; Chemical synthesis; Coatings; Nicotine chewing gum</i>					
Silver carbonate	$\text{Ag}_2\text{CO}_3$	534-16-7	275.75	6.08	218
<i>As a laboratory reagent (e.g. Koenigs-Knorr reaction); As a scrubber to remove <math>\text{CO}_2</math> (e.g. submarines); Employed in some carbon dioxide sensors; Removing dissolved chlorine from water; Preparation of some types of film for photography; Precursor chemical for making silver oxide or silver powder; Removing hydrogen sulfide and mercaptan sulfur from hydrocarbon oils; Used in the manufacture highly conductive polymers; Catalyst in the production of either ethylene oxide from ethane or acrylic acid.</i>					
Silver(I) chloride	$\text{AgCl}$	7783-90-6	143.32	5.56	455
<i>As a laboratory reagent; Preparation of ultra pure silver metal; A precursor to the preparation of silver(I) oxide; Sensitizer in photography, however to a lesser extent than silver bromide; Electroplating - both electroless and as an anode in an electric cell; As a thin coating on the surface of medical electrodes for EKG machines; Used as an anti microbial agent (for FDA approved purposes only); Decorative etching of high quality steel; Pottery glaze; Photochromic eyeglass lenses; Crystal Growth for scintillation, optics, and dosimetry.</i>					
Silver lactate	$\text{CH}_3\text{CH}(\text{OH})\text{CO}_2\text{Ag}$	128-00-7	196.94	1.70	120
<i>Silver plating; Catalyst; Precursor to making silver powder.</i>					
Silver nitrate	$\text{AgNO}_3$	7761-88-8	169.87	4.35	212
<i>Silver plating; Photography; Manufacturing of other silver compounds; Pottery glaze; As a laboratory reagent; Preparation of ultra pure silver metal; A precursor to the preparation of silver(II) oxide; Decorative etching of high quality steel.</i>					
Silver(I) oxide	$\text{Ag}_2\text{O}$	20667-12-3	231.74	7.2	230
<i>Polishing glass, coloring glass yellow; Catalyst; Pollution control filters; As a laboratory reagent; To remove carbon dioxide from aqueous solutions (laboratory reactions); Precursor to making silver powder; Component in making silver oxide batteries; As a carbon dioxide scrubber.</i>					
Silver phosphate (ortho)	$\text{Ag}_3\text{PO}_4$	7784-09-0	418.58	6.37	849
<i>Photographic emulsion agent; Catalysis; Electroplating; Crystal Growth for scintillation, optics, and dosimetry; Pharmaceutical industry; glass industry.</i>					
Silver sulfate	$\text{Ag}_2\text{SO}_4$	10294-26-5	313.80	5.45	657
<i>Electrolysis; Silver plating applications</i>					
Silver(I) sulfide	$\text{Ag}_2\text{S}$	21548-73-2	247.80	7.32	825
<i>As a laboratory reagent.</i>					

### Need Additional Information?

Visit our website at [www.alfa.com](http://www.alfa.com) for up-to-date prices, stock availability, MSDS, Certificate of Analysis, a user-friendly e-commerce system and additional literature.





## How to Order/General Information

### Pricing

Most current pricing may be found at our website. In cases where the selling price has changed significantly, we will contact you prior to filling your order.

### Shipping

Whenever possible, we will ship products by the method specified on your order.

### Technical Service

At your request, we will furnish technical assistance and information with respect to our products. Our Technical Service Representatives are trained in specific product lines to answer your questions regarding applications, specifications, product properties and handling.

### Terms of Sale

Please refer to your local sales office for full details of Terms and Conditions.

### Semi-bulk and Bulk Quantities

Items are available from stock in standard pack sizes. Stocks are also available for semi-bulk and bulk quantities. Please call for a quotation on a bulk or special order.

### Customer Service

Our dedicated scientific and commercial teams offer full service from production to delivery. Because we understand that specific packaging is often important, we offer custom packaging and labeling to meet your requirements.

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### Material Safety Data Sheets

A Material Data Safety Sheet (MSDS) for each product is available on our website and also automatically accompanies your order. If one is not immediately available, a copy will be sent via mail as soon as possible. If an MSDS is needed prior to shipment of a product please contact us or visit [www.alfa.com](http://www.alfa.com).

### Certificates of Analysis

Lot specific Certificates of Analysis for select regions are available online at [www.alfa.com](http://www.alfa.com). Please contact us by phone, fax or email to request Certificates of Analysis as needed.

### New Customers

We welcome new customers and setting up an account with Alfa Aesar is easy. Just contact us and a customer service representative will assist you.



# Specialty **Silver** Compounds

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