

Ferric Chloride

Iron(III) chloride, also called Ferric chloride, is an industrial scale commodity chemical compound, with the formula FeCl_3 . The colour of iron(III) chloride crystals depends on the viewing angle: by reflected light the crystals appear dark green, but by transmitted light they appear purple-red. Anhydrous iron(III) chloride is deliquescent, forming hydrated hydrogen chloride mists in moist air. It is rarely observed in its natural form, mineral molysite, known mainly from some fumaroles.

When dissolved in water, iron(III) chloride undergoes hydrolysis and gives off heat in an exothermic reaction. The resulting brown, acidic, and corrosive solution is used as a flocculant in sewage treatment and drinking water production, and as an etchant for copper-based metals in printed circuit boards. Anhydrous iron(III) chloride is a fairly strong Lewis acid, and it is used as a catalyst inorganic synthesis.



Specification:

Items \ Spec		Iron Chloride Anhydrous
FeCl_3	w/% \geq	96
FeCl_2	w/% \leq	2
Water Insoluble	w/% \leq	1.5

Identifiers

SKU:D9034

CAS number: 7705-08-0

Properties

Molecular formula: FeCl_3

Molar Mass: 162.2g/mol

Appearance: green-black solid

Odor: strong HCl

Density: 2.898g/cm³

Melting Point: 306 °C

Boiling Point: decomposes at 315 °C

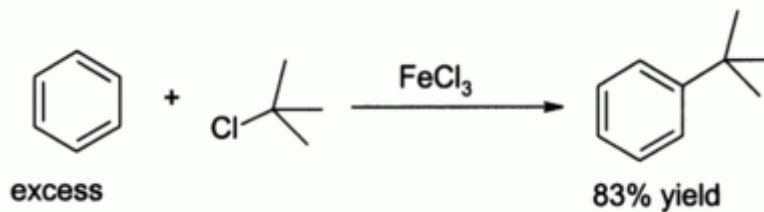
Solubility in Water:
74.4 g/100 mL(0 °C)

Protection

Iron(III) chloride is toxic, highly corrosive and acidic. The anhydrous material is a powerful dehydrating agent.

Although reports of poisoning in humans are rare, ingestion of ferric chloride can result in

	<p>serious morbidity and mortality. Inappropriate labeling and storage lead to accidental swallowing or misdiagnosis. Early diagnosis is important, especially in seriously poisoned patients.</p>
<p>Packing and Storage</p>	<p>Iron Drum 50kg net. IBC drum 1000kg net. Keep container tightly closed in a dry and well-ventilated place</p>
<p>Applications</p>	<p>Industrial</p> <p>In industrial application, iron(III) chloride is used in sewage treatment and drinking water production.^[13] In this application, FeCl₃ in slightly basic water reacts with the hydroxide ion to form a floc of iron(III) hydroxide, or more precisely formulated as FeO(OH)⁻, that can remove suspended materials.</p> $[\text{Fe}(\text{H}_2\text{O})_6]^{3+} + 4 \text{HO}^- \rightarrow [\text{Fe}(\text{H}_2\text{O})_2(\text{HO})_4]^- + 4 \text{H}_2\text{O} \rightarrow [\text{Fe}(\text{H}_2\text{O})\text{O}(\text{HO})_2]^- + 6 \text{H}_2\text{O}$ <p>It is also used as a leaching agent in chloride hydrometallurgy,^[14] for example in the production of Si from FeSi. (Silgrain process)^[15]</p> <p>Another important application of iron(III) chloride is etching copper in two-step redox reaction to copper(I) chloride and then to copper(II) chloride in the production of printed circuit boards.^[16]</p> $\text{FeCl}_3 + \text{Cu} \rightarrow \text{FeCl}_2 + \text{CuCl}$ $\text{FeCl}_3 + \text{CuCl} \rightarrow \text{FeCl}_2 + \text{CuCl}_2$ <p>Iron(III) chloride is used as catalyst for the reaction of ethylene with chlorine, forming ethylene dichloride (1,2-dichloroethane), an important commodity chemical, which is mainly used for the industrial production of vinyl chloride, the monomer for making PVC.</p> $\text{H}_2\text{C}=\text{CH}_2 + \text{Cl}_2 \rightarrow \text{ClCH}_2\text{CH}_2\text{Cl}$ <p>Laboratory use</p> <p>In the laboratory iron(III) chloride is commonly employed as a Lewis acid for catalysing reactions such as chlorination of aromatic compounds and Friedel-Crafts reaction of aromatics. It is less powerful than aluminium chloride, but in some cases this mildness leads to higher yields, for example in the alkylation of benzene:</p>



The [ferric chloride test](#) is a traditional colorimetric test for [phenols](#), which uses a 1% iron(III) chloride solution that has been neutralised with [sodium hydroxide](#) until a slight precipitate of FeO(OH) is formed.^[17] The mixture is filtered before use. The organic substance is dissolved in water, [methanol](#) or [ethanol](#), then the neutralised iron(III) chloride solution is added—a transient or permanent coloration (usually purple, green or blue) indicates the presence of a phenol or enol.

This reaction is exploited in the [Trinder spot test](#), which is used to indicate the presence of salicylates, particularly [salicylic acid](#), which contains a phenolic OH group.

Other uses

- Used in anhydrous form as a drying reagent in certain reactions.
- Used to detect the presence of phenol compounds in organic synthesis e.g.: examining purity of synthesised [Aspirin](#).
- Used in water and wastewater treatment to precipitate phosphate as iron(III) phosphate.
- Used by American coin collectors to identify the dates of [Buffalo nickels](#) that are so badly worn that the date is no longer visible.
- Used by knife craftsmen and sword smiths to stain blades, as to give a contrasting effect to the metal, and to view metal layering or imperfections.
- Used to etch the [widmanstatten pattern](#) in iron [meteorites](#).
- Necessary for the etching of [photogravure](#) plates for printing photographic and fine art images in [intaglio](#) and for etching [rotogravure](#) cylinders used in the printing industry.
- Used to make [printed circuit boards](#) (PCBs).
- Used in veterinary practice to treat overcropping of an animal's claws, particularly when the overcropping results in bleeding.
- Reacts with cyclopentadienylmagnesium bromide in one preparation of [ferrocene](#), a metal-sandwich complex.^[18]
- Sometimes used in a technique of [Raku ware](#) firing, the iron coloring a pottery piece shades of pink, brown, and orange.
- Used to test the pitting and crevice corrosion resistance of stainless steels and other

	<p>alloys.</p> <ul style="list-style-type: none">• Used in conjunction with NaI in acetonitrile to mildly reduce organic azides to primary amines.^[19]• Used in an animal thrombosis model.^[20]
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*Data from Wikipedia