



FERRATE
SOLUTIONS

History

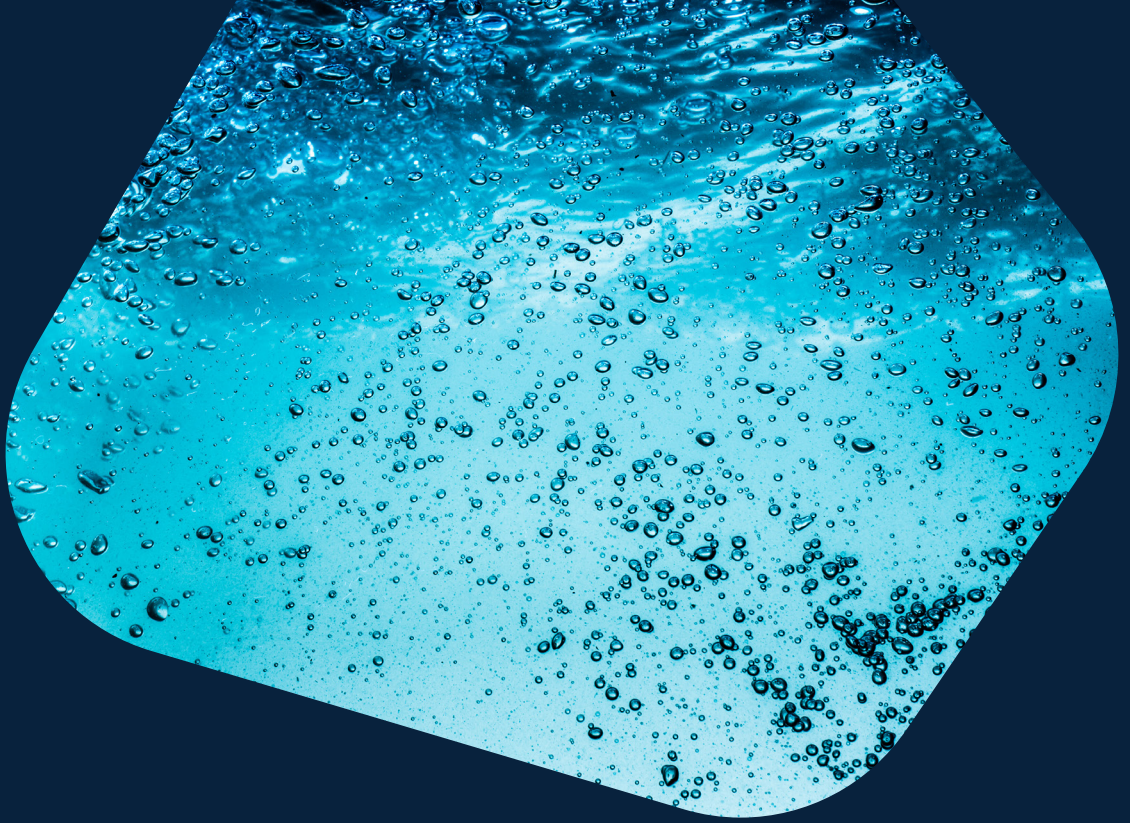
World's Oldest "Breakthrough" Technology

Oxo compounds of iron (Ferrates) were first synthesized 1715 in Germany, and since that time high valence (Fe^{4+} through Fe^{7+}) oxo anions of iron (Ferrates) have been studied by chemists. Commercial utilization of these unusual compounds however, has been extremely limited, primarily because of the difficulty in synthesizing them and their inherent instability. The most stable of the Ferrates is Ferrate(VI), or FeO_4^{2-} . Because of the high valence of iron in these compounds they are strong oxidants, and because the residual from any chemical reaction is simply ferric iron (the most common element on earth) they should be commercially useful. In fact, given these unique properties, their use for treating water and wastewater to remove contaminants would seem like an obvious avenue to explore; but it was not until the 1970s that research in the laboratories of Dr. T.D. Waite was started on the use of ferrates for environmental applications. Ferrate(VI) research continues today world-wide generating >2,000 scientific publications per year. As anticipated, Ferrate(VI) has been repeatedly demonstrated to be a powerful oxidant of environmental contaminants, and to rapidly decompose to ferric iron which quickly precipitates from the solution. Because the residual is non-toxic ferric iron, it can be safely land-applied for disposal or recycled. This would be considered a "Green" chemical today.

There Must Be A Way

It became clear to Dr. Waite many years ago that a pure Ferrate(VI) powder could never be generated at a competitive cost for use in large-scale environmental applications. However, it was possible that the inexpensive Ferrate(VI) solution generated without further purification could be utilized and would be competitive in price, thereby providing a commercial supply of Ferrate(VI) to the environmental market. However, because of the instability of any Ferrate product, it would need to be produced near-by or central to the site of its application. After years of research and development Dr. Waite perfected Ferrate(VI) blends, produced with inexpensive chemical feedstocks, along with support unit operations that could utilize liquid Ferrate(VI) products. For the past eight years Dr. Waite has worked on treating all types of water and wastewater using these unique Ferrate(VI) solutions.

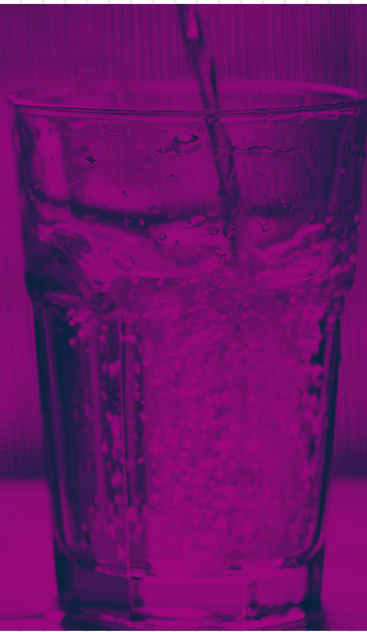
Learn more at Ferrate-Solutions.com



It's been a long time since municipalities have had a new technology to treat drinking water.

The wait is over. In 2019, there is a new water treatment technology coming to market that can handle most of the water quality challenges facing drinking water producers.

Ferrate Solutions Inc.



- **Oxidize** – taste & odor compounds, ammonia, color, sulfides
 - **Disinfect** – bacteria, viruses, Cryptosporidium, Giardia
 - **Coagulate** – suspended solids, co-precipitate toxic metals
 - **Least sludge** – minimum sludge generation, easy to de-water, non-toxic
 - **Pre-treatment** for RO desalination
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Cost and process predictability.

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Meeting all drinking water standards.

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The Ferrate Solution.

Learn more at [Ferrate-Solutions.com](https://www.ferrate-solutions.com)



Treatment systems.

In conjunction with our OEM, FS designs, fabricates, tests, installs, guarantees and maintains all components for site-specific designed Ferrate – based treatment systems. The FS Ferrate systems can be scaled to any size application. The unit operations of the systems are modular and easily transported to any location. These systems can be stand-alone, or interface with existing facilities. Total system design includes proprietary Ferrate synthesis, feed systems, flash mixing, flocculation, and clarification systems as required. Facilities for storage and handling of feedstock chemicals (ferric, caustic, and bleach) can also be designed and fabricated if the feedstocks are not already present at the site. All FS systems are fully process controlled and can be remotely controlled from central locations. FS engineers can interface their systems into any existing water, wastewater or industrial waste treatment system. FS treatment systems can be purchased outright or leased through one of several programs provided by FS.

Invest in a Clean Future

Ferrate Solutions Inc. is currently seeking investors who are interested in bringing this technology to the international market place.

For inquiries, please contact Geoffrey P. Wight.

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The International Commercialization of Ferrate

