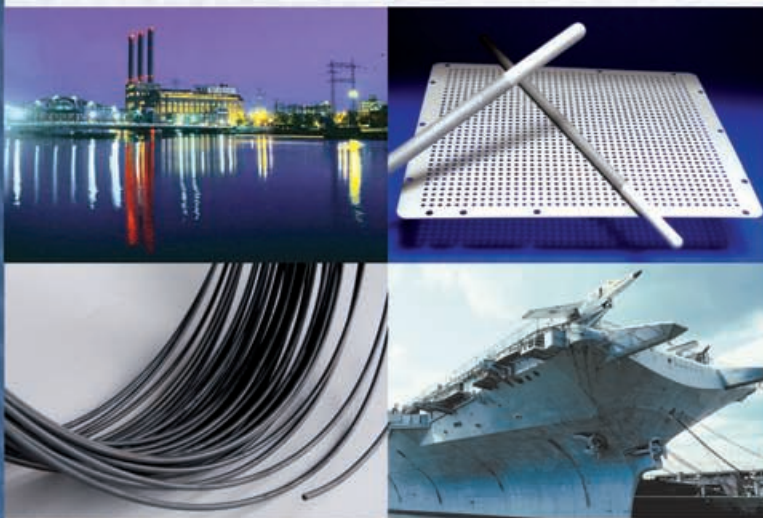


OptimumOxides™ Data Sheet

Optimum Anode Technologies is recognized as a reliable quality supplier of dimensionally stable anodes with superior lead times and is a business affiliate of Titan Metal Fabricators. Optimum Anode Technologies combines the excellent reputation and manufacturing know-how of Titan Metal Fabricators, a leading supplier of titanium and other exotic metal fabrication, with the industry experience of Optimum Anode Technologies' management in the manufacturing of dimensionally stable anode coatings. Our industry experts have more than 25 years of experience in anode technology, manufacturing and market expertise in supplying cost effective products that meet or exceed our customers' dimensionally stable anode needs.

OptimumOxides™ is a series of precious metal oxide coating with the primary oxide coating being Ruthenium, Iridium, Platinum and Palladium. The primary precious metal oxide is then combined with other precious metal and/or other valve or base metal oxides to produce a mixed metal oxide coating. This coating is a highly efficient, robust electrochemical catalyst which can provide many years of uninterrupted efficient service.

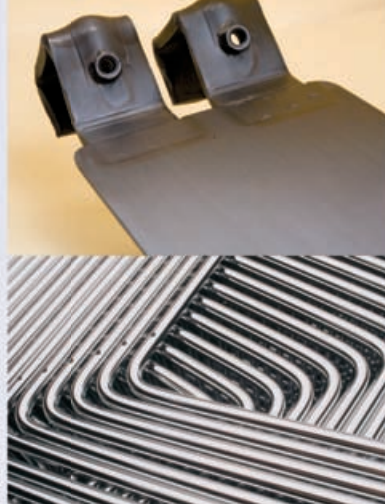
The coating(s) are selected by our technology experts by first listening to the specifics of your application(s). This process helps identify the details and nuances of the technical, operational and financial aspects of your desired business goals.



IRoxide™

IRoxide™ coating is Optimum Anode Technologies' Iridium Oxide series of anode formulations which provide for the energy efficient production of oxygen. Iridium, the primary precious metal, is converted to oxide. Depending on the environment and the exact requirements, the Iridium can be combined with other precious metal and/or base metal oxides. This combination can produce the optimum electrochemical catalyst for your specific process conditions and desired operating performance and product results.

IRoxide™ coating formulations are robust and therefore formulated to withstand harsh acidic environments. This is especially true when encountered at the anodes' catalytic surface when the electrolyte is acid and/or the desired reaction is the most efficient generation of oxygen IRoxide™.



Typical Attributes

IROxide™ is a mixed metal oxide coating which is typically applied to a titanium substrate via a controlled thermal decomposition process specific to the formulation being applied.

- Typical oxide loading 5-30 g/m² with maximum loading of ~ 70 g/m².
- Standard support substrate is titanium although the coating can be applied to titanium clad as well as tantalum.
- Surface preparation is carefully controlled to ensure maximum adhesion and the conductivity to the coating.
- Efficient over potential for oxygen evolution.
- Durable in acid electrolytes.
- Quality is assured through in-process controls but also verified by final quality control that is inclusive of weight gain, XRF and SEP measurements as well as process specific adhesion tests.
- All shipments are accompanied by Optimum Anode Technologies quality certificate and guarantee of workmanship.
- Packaging is specifically created to assure the product we produce arrives safely at our customers' point of use.

Typical Applications

- Electrolytic Recovery
- Cathodic Protection
- Electrophoresis
- Electrosynthesis of Organic and Inorganic Compounds
- Electrodialysis
- Bio-pharmaceutical
- Analytical
- Electrodionization
- Electrogalvanizing
- Others

Available Shapes

- Mesh
- Sheet
- Rods
- Wire
- Custom Fabricated Parts



ChlorOxide™



ChlorOxide™

ChlorOxide™ coating is Optimum Anode Technologies' series of coating electrochemically produced chlorine, chlorate and sodium hypochlorite. This series of coatings contain ruthenium as the major precious metal oxide which is then formulated with other precious metal, valve metal and base metal oxide to provide the most cost effective and highly efficient electrochemical catalyst available.

Coatings are very electrochemically selective and efficient in the anodic generation of chlorine. However as the technology and processes varies within and across the products, it is extremely critical to understand the details of each specific site to guarantee the proper ChlorOxide™ coating formulation to achieve the optimum balance of efficiency and life span.

Typical Attributes

ChlorOxide™ is a ruthenium based mixed metal oxide coating which is typically applied to a titanium substrate via a controlled thermal decomposition process specific to the formulation being applied.

- Typical oxide loading 5-30 g/m² with maximum loading of ~ 150 g/m².
- Standard support substrate is titanium although the coating can be applied to titanium clad as well as tantalum.
- Surface preparation is carefully controlled to ensure maximum adhesion and the conductivity to the coating.
- In-process control and monitoring of the coating application and thermo decomposition.
- Efficient over potential for chlorine evolution.
- Highly efficient for the generation of chlorine and chlorine compounds.
- Quality is assured through in process controls but also verified by final quality control that is inclusive of weight gain, XRF and SEP measurements as well as process specific adhesion tests.
- All shipments are accompanied by Optimum Anode Technologies quality certificate and guarantee of workmanship.
- Packaging is specifically created to assure the product we produce arrives safely at our customers' point of use.



ChlorOxide™ *(continued)*

Typical Applications

- Seawater and Brine Electrochlorination
- Electrolytic Production of Sodium Chlorate
- Swimming Pool Electrochlorinators
- Electrolytic Production of Sodium Chlorite
- Membrane Chlor Alkali Cells
- Mercury Chlor Alkali Cells
- Diaphragm Chlor Alkali Cells

Available Shapes

- Mesh
- Sheet
- Louvre Type Electrodes
- Rods
- Wire
- Custom Fabricated Parts

The commitment of Optimum Anode Technologies' management is to provide our customers a quality product in a timely manner that meets or exceeds their technical and operational needs. We continually apply our unique fact finding and discovery consultative selling process to provide the most cost-effective solution for our customers.



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