

## **Anodic Oxidation**

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The Genetic Makeup of the Anodic Oxidation

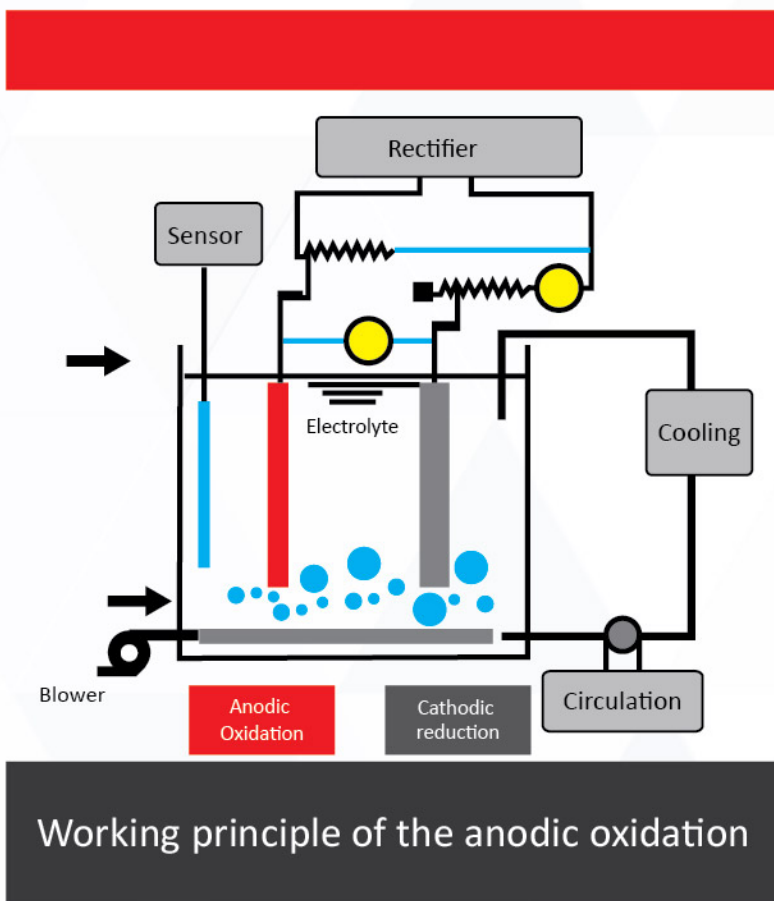
Gene Engineering

The Members of the Anodizing Family

Key Aspects for Practice Consistency

# The Genetic Makeup of the Anodic Oxidation

## What is Anodic Oxidation?



The principle of anodic oxidation of aluminum is essentially that of hydro-electrolysis. When voltage is applied, the aluminum is anodically polarized. This results in a reaction where  $O^{2-}$  ions from the electrolyte move in the opposite direction, and  $Al_{3+}$  ions simultaneously migrate away from the metal towards the electrolyte interface to form an anhydrous oxide  $Al_2O_3$ , or the oxide film.

The development of mechanical fabrication and surface treatment on aluminum products is a typical example of evolutionary arm race in the aluminum realm, which has brought growing attention to anodic oxidation by various industries. Take Apples well under the spotlight iPhone 7 for instance, the company has launched high-gloss Jet Black and matte Black colors to complement Silver, Gold and Rose Gold hues, which is well received by the public. These variegated colour options can be attributed to the anodic oxidation process. We, at Victor, are specialized in this technique for decades, and are ready to bring the colour pallet that suits your need.

# Gene Engineering

## The 9 Key Processes of Anodic Oxidation

- Skimming 1** To remove grease from surface for the preparation of the subsequent process.
- Alkaline Cleaning 2** To remove residues from grease, natural oxidized film, or burs.
- Neutralizing 3** To remove residues from oxidized black film and metal substances.
- Chemical Polishing 4** To enhance glossiness on the surface, forming at the top layer of the part more susceptible for further chemical process.
- Anodic Oxidation 5** To form anodic film on aluminum or alloyed aluminum when direct current is applied.
- Surfactant 6** To reduce surface tension for better dyeing results on the surface of a part.
- Dyeing 7** To apply a desired colour to a part surface.
- Sealing 8** An insurance of colour fastness by way of impregnation seal of micro pores of anodic film.
- Drying 9** To air dry surface of a part or bores.

# The Members of the Anodizing Family

Through chemical and mechanical rinse on surface which is essential to the process, the metal substrate is fully exposed for the success of subsequent anodic dyeing, which ensures proper bonding of the dye and the substrate, satisfying colour range and film thickness, as well as ideal anodizing qualities such as high corrosion-resistance, abrasion-resistance and weatherproofness.



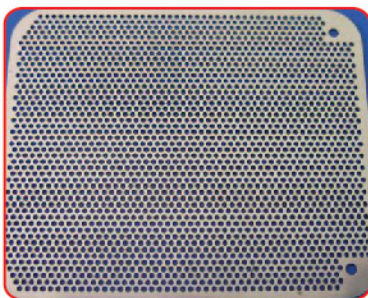
Hard Anodizing

This practice brings the film thickness to 25-150um which makes it highly corrosion resistance. Its hardness and abrasion-resistance are superior to that of the conventional practices.



Electrolytic Coloring of Anodic Coatings

This is two-step electrolytic process: first a transparent prime anodic film is acquired through sulphuric acid compound, then a coloured film is achieved by deposition of metallic particles in the pores of an anodic coating by the passage of a Direct or Alternating Electric Current through a solution containing certain type of metallic salt.



Chemical Etching

This practice is, by utilizing photo-chemistry, a chemical process by etching out the undesired part of a pattern from an aluminum part.



ED - Electrophoresis

This practice works best on edges/seams or cavities of a shape where the area is highly aqueous-soluble. It provides excellent finish coverage. This practice is well-known for its coating thickness consistency, high corrosion-resistance, excellent finish quality, free from flow lines, and its lesser effect on environment concerns.



Light Exposure and Image Development

Light Exposure: by source-light effect to transpose the image from the negatives to a light-sensitive base sheet. Image Development: by alkaline solution effect, to wipe out any material that does not respond to photosynthesis.

# Key Aspects for Practice Consistency

The following are the key aspects to preclude such common symptoms in anodizing practices as inconsistency in dyeing, unevenness of film thickness, abrasion, and contamination.

## Dyeing Consistency

1. Dual-edge overflow design of dyeing tank – effective control of foam in dyeing tanks, which may cause dyeing defects on product surface;
2. Auto-detect and control on PH value in dyeing tanks – real-time detection and control over PH value and auto-adjustment;
3. Spectrophotometer—to guarantee accurate measurement of each set of solution concentration from each dyeing tank;
4. Thermo-monitor system and HE ice-water cooling system – to guarantee effective temperature.

## Film Thickness Unevenness

1. Sophisticated chemical analytic devices (ion chromatograph) –for guaranteed measurement on concentration of each anodic tank;
2. Auto-chemical-dispensing device – for ultimate tank solution consistency.

## Abrasion -Proof

1. Auto overhand crane operation and thermo-monitoring system – to maintain consistent sealing timing and tank temperature for guaranteed sealing quality;
2. Hot water self-replenishing device in Sealant Tanks – to guarantee thermostatic.

## Contamination -Proof

1. 160 sets of supersonic cleaning devices –to reduce contamination and colour variance;
2. Sophisticated chemical analytic devices (ion chromatograph) – to safeguard the quality of pure water in anodic lines;
3. Real-time monitoring system of PH value in rinse tanks and electric conductivity and auto-overflow detecting and adjusting system – to safeguard water quality in rinse tanks.

## **COMPANY PROFILE**

Our company was founded in year 2000. Being a company specialized in sophisticated alloyed aluminum fabrication and high-end surface treatment, JM Victor is not only refined with hands-on experiences through years of accumulation through the sector chain of precision manufacture, but also with unparalleled wealth of knowledge enriched from company operation and management process, which enables the company to offer solutions in overcoming design and production bottlenecks in high-end aluminum fabrication.

In Jiangmen High-Tech Industrial Park, we have invested in construction of our new cyber-physical powered Smart Plant embracing the core Industry 4.0 design concept. The new plant, residing on an area of 100,000 square metres, comprising a global lab of aluminum-magnesium surface treatment and a smart CNC fab centre with its own casting house and stamping workshop, will add on a new chapter of consummate expertise to the venture of JM Victor.

### **Our Mission Statement**

We stand by our commitment to share the harvest and happiness with our staff and workers, create value for our customers and cultivate a company culture with a vision. This is the foundation for the sustainability and continuity of our company and our business.



## **Guangdong Victor Aluminum Co.,Ltd.**

Address: No.11 JinHui Road,High-Tech Development Zone,Jiangmen,Guangdong,China.

Tel: 0750-3869777

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

Email: [contactus@victoralu.com](mailto:contactus@victoralu.com)

Facebook/Twitter: Victor Aluminum