Platinized Titanium and MMO Anodes in Electroplating Applications

Umicore products are available throughout North America exclusively thorugh

UYEMURA

The world of noble and functional surfaces

umicore Electroplating

Contents

Comparison

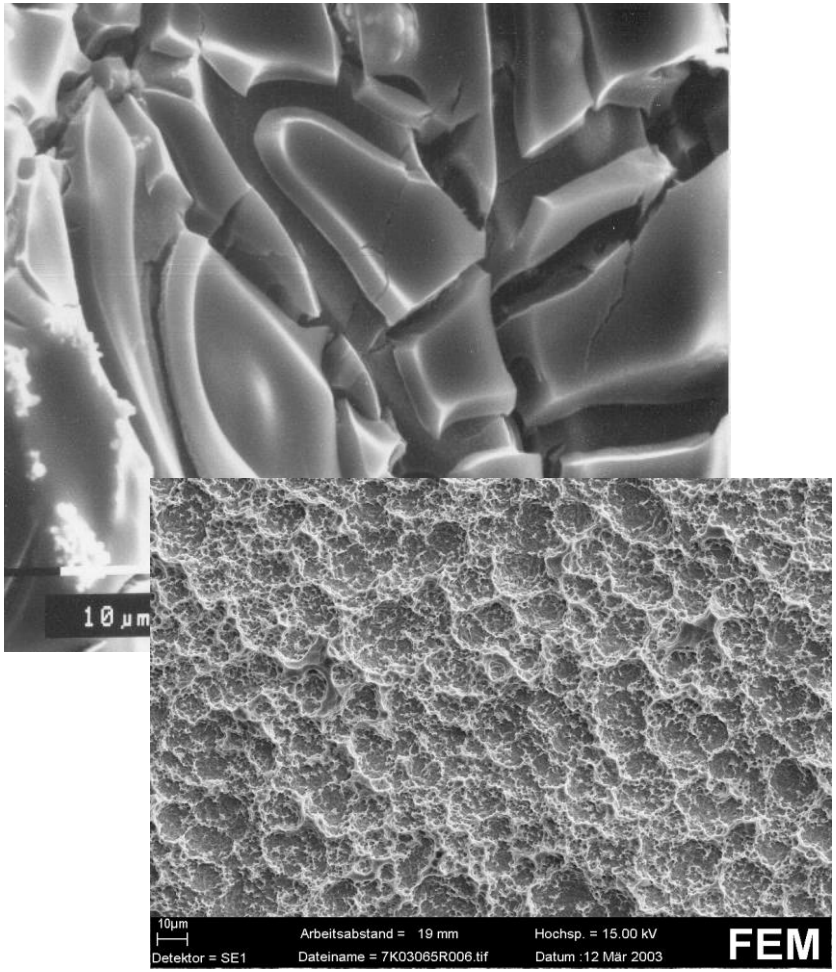
HTE Platinized Anodes vs. MMO Anodes

Comparison

	Mixed Metal Oxide Anodes	Platinized Anodes
Electro Catalyst	Ir-oxide and/or Ru-oxide mixed with Ta-oxide and/or Ti-oxide etc.	Pure Platinum >99,8%
Layer	Sandwich Layers Setup	Platinum crystal structure
Adhesion	Pure Mechanical Adhesion	Physic-Chemical Adhesion
Coating process	Manual: Paint Brush, Spray or Roller Coating + Thermal Conversion Process	Electrolytic Deposition

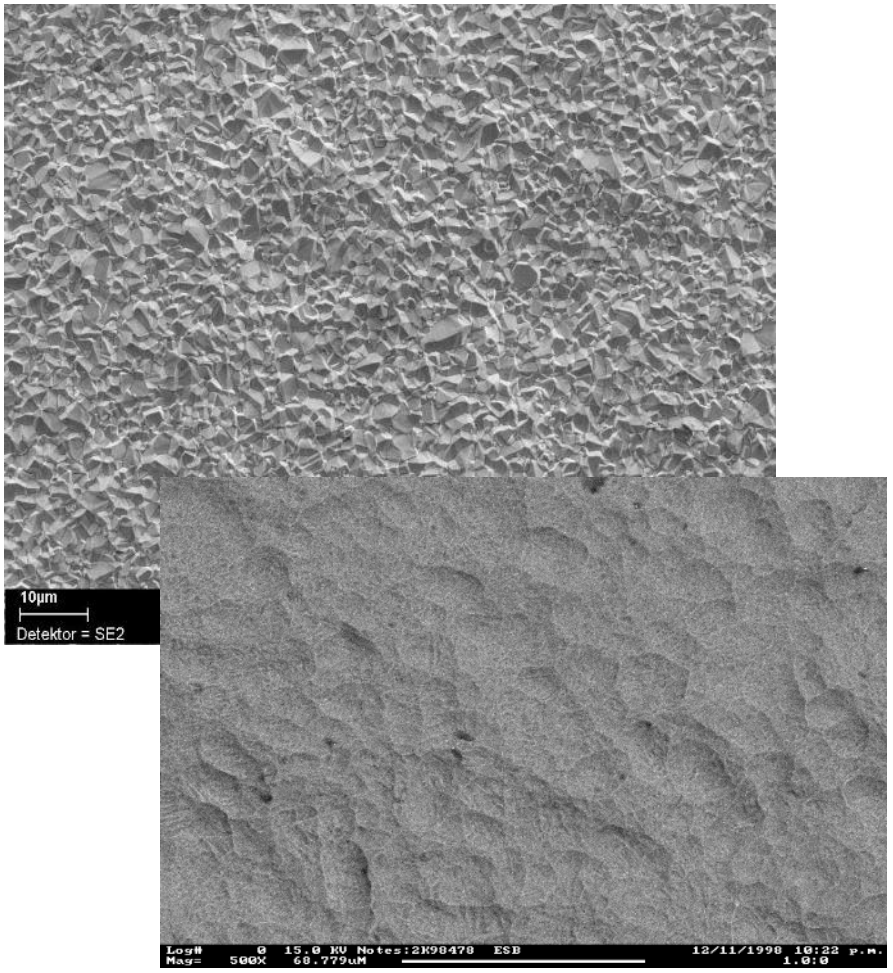
Comparison

MMO- layer:



Ti-base-metal surface:

HTE-Platinum- layer:



Ti-base-metal surface:

HTE Platinized Anodes

Composition and Properties

Metal deposition from Umicore's HTE process

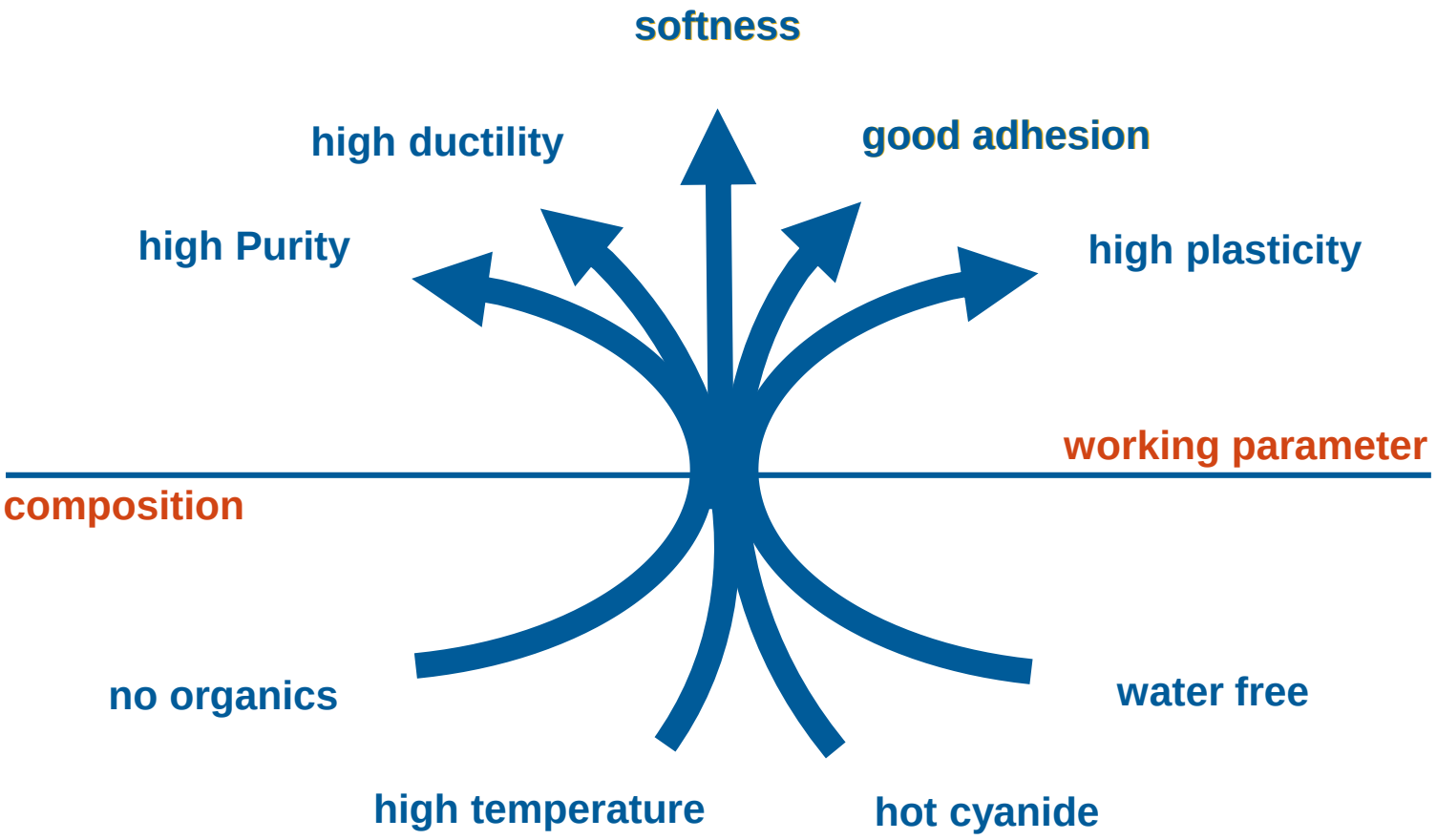
Process parameters

electrolyte composition	52 % KCN
	48 % NaCN
	1-3% Pt
operation temperature	500-600 °C
cathodic current density	1-5 A/dm2
deposition rate	10-50 µm/h
deposition voltage	0.1 - 2.0 V

Composition and Process Parameter resulting in excellent Coating Properties

Properties of HTE-platinum coatings

Factors of influence



Enables High Quality Platinum Layer

Properties of HTE-platinum coatings

properties	Coating method	
	HTE-Platinum	Aqueous Platinum
purity	99,99 %	99,4 %
ductility	5 %	< 0,1 %
hardness	80 $HV_{0,05}$	500 $HV_{0,05}$
electrolyte conductivity	high	Low
adhesion	high	Low
internal stress	--	> 50 N/mm^2
plasticity	Can be plastically deformed	brittle

Creates High-end Platinized Anodes with Best Performance and Service Life

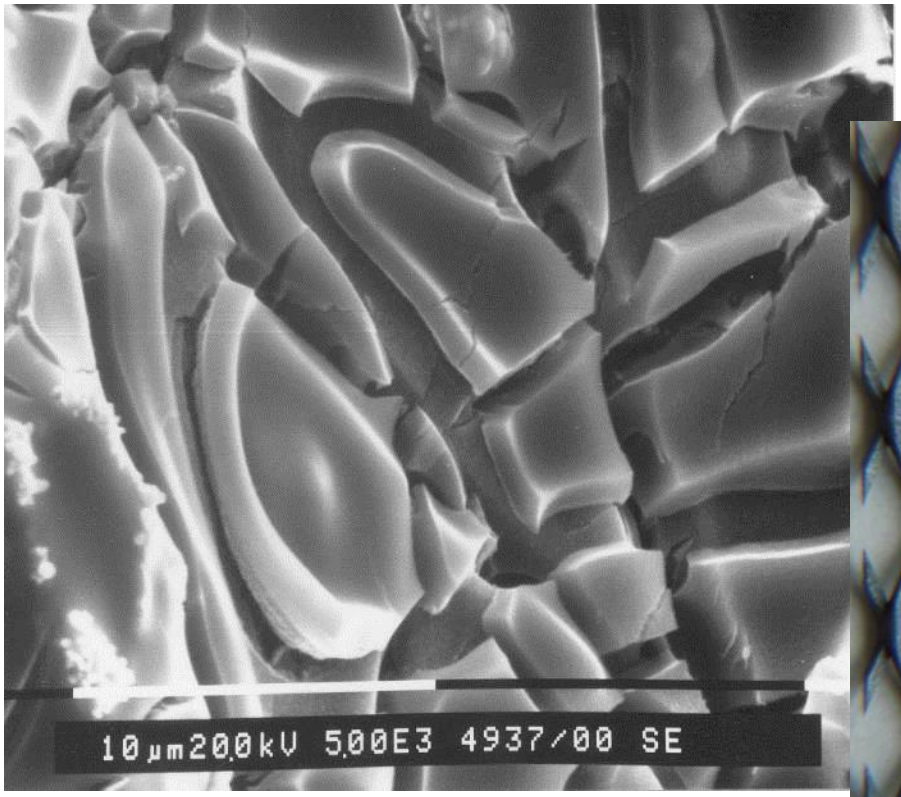
The HTE Platinum Coating delivers excellent performance and a long service life. It is the best platinized Anode quality available, at a reasonable price.

MMO Anodes

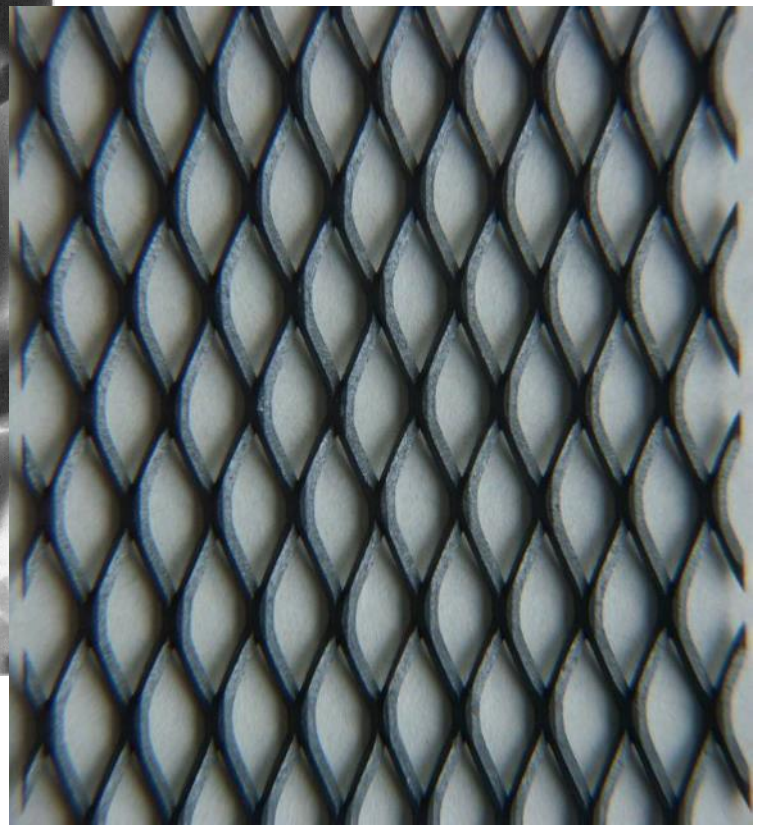
Quality and Features

Layer Structure of MMO Coating

REM-picture of MMO-microstucture:



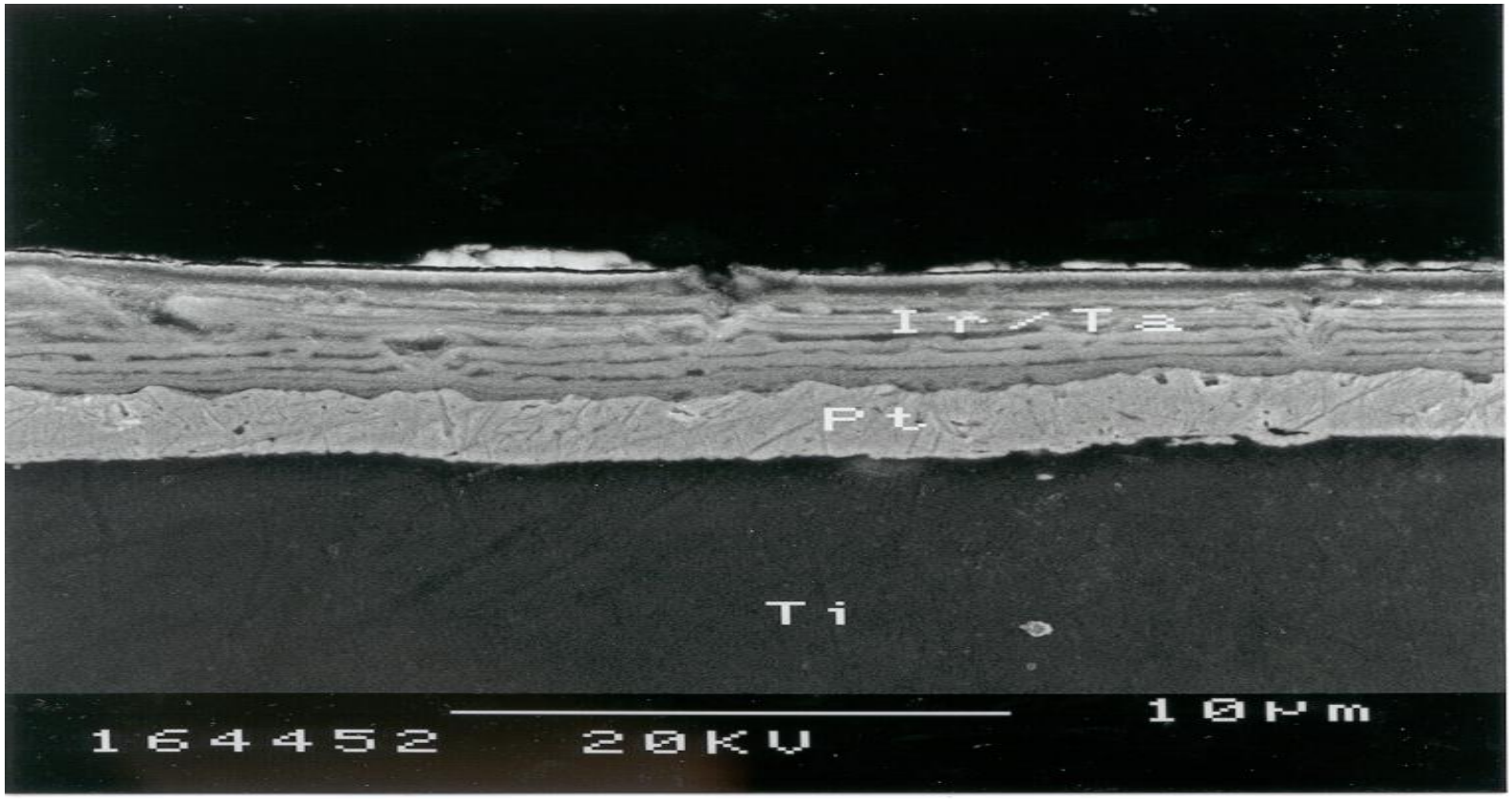
Picture of MMO-Mesh Type N:



Cracked Layer Structure Requires Sandwich Setup

Layer Structure of MMO Coating

Sandwich Layer Setup



Umicore’s Layer Setup shows highest Quality and Corrosion Resistance

Umicore Standard MMO Coating Types

Platinode® 187 SO / LOC	Optimized anode coating for low organic consumption avoids undesirable anode reactions
Platinode® 177	Excellent behavior in acidic electrolytes
Platinode® 167	Excellent behavior in alkaline and cyanide electrolytes
Platinode® 147	Used for weak acidic / alkaline electrolytes
Platinode® 197	For different kind of water electrolysis
Platinode® 197SN	High performance in cooling water systems

In addition to standard MMO coatings, we develop coatings customized to the application.

MMO Features

- Long service life in acidic solutions
- Low organic consumption / low oxygen evolving potential
- Undesirable anode reactions can be avoided
- More cost effective than PtTi anodes
- Less precious metal consumption
- Excellent cost benefit ratio for a broad range of applications

MMO anode coating is ideal for numerous electroplating and other applications, and an excellent alternative to platinized anodes, at a lower cost.

Future requirements for electrolyte-protective and gentle anode systems can be met with Umicore MMO anodes

Typical Applications

General Overview

UYEMURA USA

uyemura.com

UYEMURA
Corporate Headquarters:
3990 Concours, #425
Ontario, CA 91764
ph: (909) 466-5635

UYEMURA
Tech Center:
240 Town Line Road
Southington, CT 06489
ph: (860) 793-4011

For sales and product information, **click here**

Einsatzgebiete verschiedener Anodenmaterialien — Fields of application of different anode materials

umicore	Platiniertes Titan Platinized titanium	Platiniertes Niob Platinized niobium	Iridium-Mischoxid Iridium mixed oxide	Ruthenium-Mischoxid Ruthenium mixed oxide	Membran Anode Membrane anode
Rutheniumbäder, stark sauer Ruthenium baths, strongly acid		1,5/2,5 µm	177		
Platinbäder, stark sauer Platinum baths, strongly acid		1,5/2,5 µm	177		
Rhodiumbäder, stark sauer Rhodium baths, strongly acid	2,5 µm	1,5/2,5 µm	177		
Goldbäder, stark sauer Gold baths, strongly acid		1,5/2,5 µm	177		
Goldbäder, schwach sauer Gold baths, weakly acid	1,5 µm			147	177 DMT
Goldbäder, alkalisch Gold baths, alkaline	1,5 µm			147	
Bronzebäder, cyanid. alkalisch Bronze baths, cyanide-alkaline				167	
Bronzebäder, cyanfrei Bronze baths, cyanid-free			187 LOC	167	
Silberbäder, cyanid. alkalisch Silver baths, cyanide-alkaline				167	
Sauer Kupfer Acid copper			187 SO 187 LOC		
Halogenhaltige Electrolyte Halogen-containing electrolytes		2,5/5,0	177		
Hartverchromung fluoridfrei Hard chromium plating, fluoride-free	2,5/5 µm				
Hartverchromung halogenhaltig Hard chromium plating, halogen-containing		2,5/5,0			
Verchromung Cr^{3+}-haltig Chromium-plating, containing Cr^{3+}			187 LOC		
Zink/Zinklegierungsbäder, alkalisch Zinc/Zinc alloy bath, alkaline			177 187 LOC		
Pd, Pd/Ni-Bäder, ammoniakalisch Pd, Pd/Ni baths, ammoniacal			187 SO		
Pd/Ni-Bäder (ACF) ammoniumfrei, chloridfrei Pd/Ni baths (ACF) ammonium-free, chloride-fre			187 SO		177 DMT
Nickel/Nickellegierungsbäder Nickel/nickel alloy baths	1,5 µm		177 187 LOC		
Trinkwasseraufbereitung Drinking water conditioning				197	
Schwimmbadwasseraufbereitung Treatment of swimming pool water				197	
Cyanidische Abwässer Cyanide waste waters	1,5 µm				
Elektrolytische Edelmetallrückgewinnung Electrolytic precious metal recovery			177		
Anodisieren Anodizing	1,5/2,5 µm				