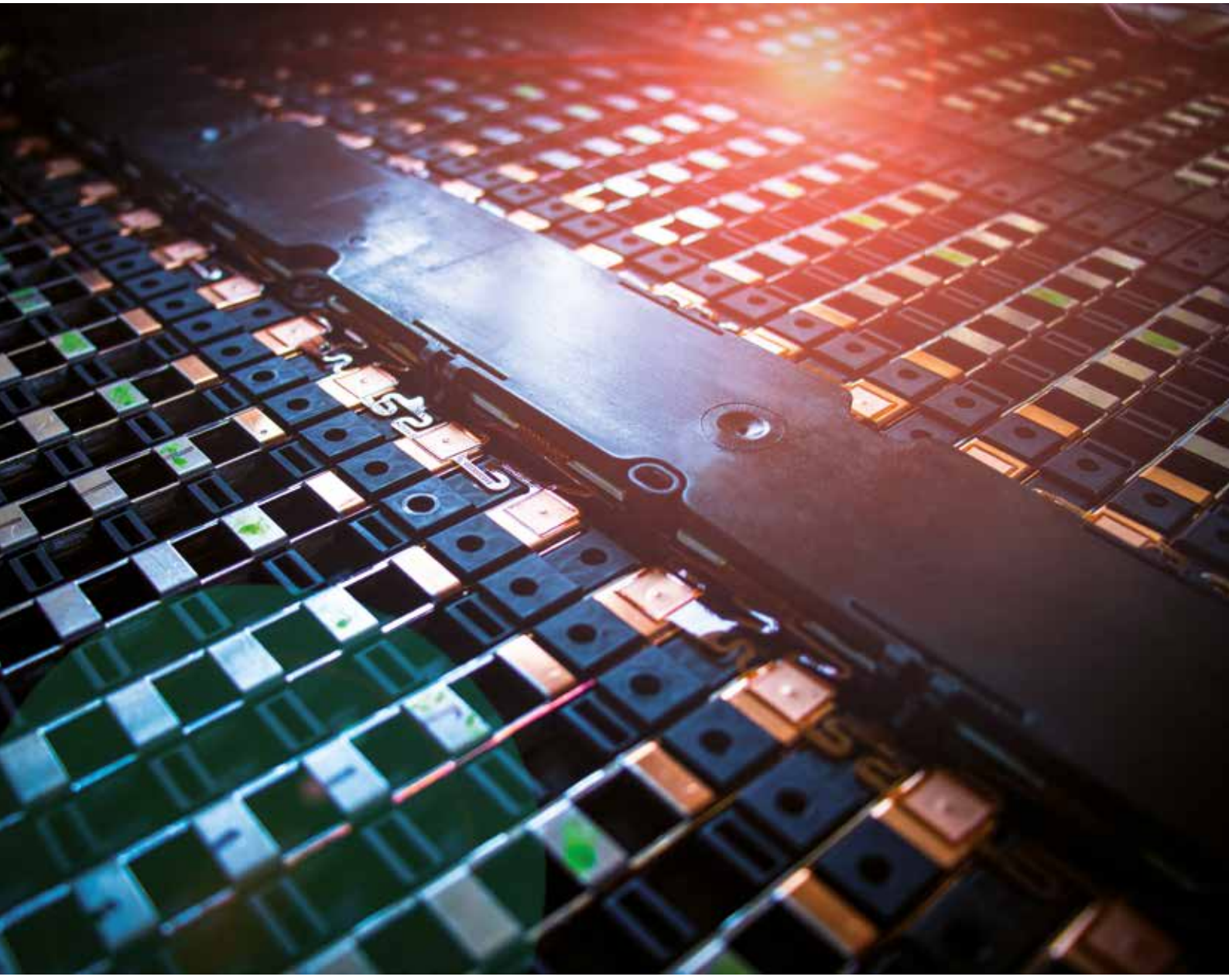
EV, HEV and PHEV batteries

Driving mobility with innovative and sustainable surface finishing solutions

Electronics & General Metal Finishing

atotech.com



mks | Atotech

Leading surface-finishing solutions for EV, HEV and PHEV batteries

Lithium-ion batteries power electric and hybrid vehicles while simultaneously reducing automobile carbon dioxide emissions. A primary goal of new battery technologies is to facilitate higher-density energy storage. However, innovations in battery technologies also require advances in surface treatment techniques.

Battery manufacturers strive to achieve an effective reach for electric vehicles that is comparable to internal combustion engine automobiles. New and future battery technologies aim to increase the energy density of the battery pack. These new technologies, which consist of new active materials or thinner current collector foils, require new, viable manufacturing processes and surface treatments.

We offer perfectly matched processes for every step of surface finishing application; from pretreatment to final sealing.

Battery cell

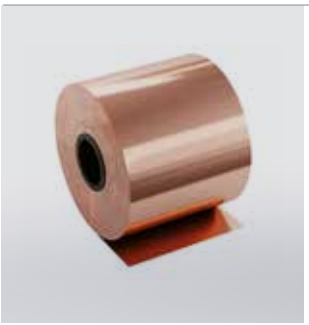
- Cathode and anode current collector
- Connectors and busbars
- Anode lead tabs

Battery module

- Battery housing and fasteners
- Electromagnetic shielding
- Battery and cell management

Cathode and anode current collectors

Advanced battery technology, especially high-capacity active materials on current collectors, requires adhesion improvement through adjusted adhesion promoters. Atotech offers adhesion promotion solutions ranging from tailor-made molecules, to adhesion promotion processes, to application expertise for the best manufacturing results. Our range of copper and aluminum foil treatments improves adhesion to resins and polyimide.



Copper plating for thin and low stress foils and adhesion promotion

Thinner copper foils, which are characterized by lower stress, more even surfaces and new material combinations for manufacturing current collectors, facilitate weight reduction. Copper plating on top of alternative materials also promotes enhanced conductivity, while surface treatment of the deposited copper layers improves adhesion and corrosion protection. We offer the complete process for copper plating on various base materials, as well as copper surface treatment for corrosion resistance and adhesion promotion.

Cupracid® HCD: High-speed copper plating process with good ductility and low internal stress resulting in low warpage

Bondfilm®: Adhesion promoter providing surface roughness and surface increase for an improved Cu-current collector to binder adhesion

CovaBond®: Chemical resistant adhesion promoter for plated organic current collectors providing surface roughness and surface increase for an improved metal layer adhesion

Pretreatment and electroless nickel processes for aluminum foil plating and adhesion promoters

A wide variety of aluminum alloys require specific treatment chemistry for proper surface preparation. Atotech long-life processes facilitate excellent adhesion. we have a strong portfolio of state-of-the-art high, medium, and low phosphorus electroless nickel solutions. Our electroless nickel processes are designed to plate on aluminum for high corrosion and wear resistance.

Uniclean® 151: Non-etch soak cleaner with high cleaning power and contamination retention

Uniclean® 1020: Alkaline etch with high metal sequestration for longer lifetimes

AlumEtch® LF: Desmut for a wide range of aluminum alloys and with NOx suppression

AlumSeal® 611: Zincate for Al designed to produce very thin zinc coating and reduce drag-in into the EN bath

Nichem® MP 1188: Medium-phosphorus electroless nickel process designed to plate zincated Al. High tolerance to zinc

Nichem® HP 1170: High-phosphorus electroless nickel process offers an exceptionally high level of corrosion protection in acidic conditions

Connectors and busbars

Connectors and busbars transmit high current loads and resist attrition caused by constant motion during system operation. It is therefore essential that they are highly conductive and wear resistant. As the leading supplier of nickel silver and nickel tin plating processes, as well as anti-tarnishes for connectors and busbars, we offer complete processes from pretreatment to nickel barrier and subsequent hard silver plating to Cr(III) based layers for protection. We additionally offer processes from pretreatment, to nickel barrier and subsequent MSA based pure tin plating, to heat and humidity resisting anti-tarnishes.

Nickel, silver and tin plating

Power train connectors require low contact and high wear resistance. A stack of hard silver layers on top of nickel deposits provides both of these qualities, and Atotech product portfolio utilizes this optimal combination.

Moreover, tin is an increasingly attractive alternative to expensive precious metal coatings for busbars. Atotech Stannopure® PF 10 is a completely green and sustainable solution that doesn't sacrifice effectiveness.

Ni Sulfamate: High-speed pure nickel deposition process

Novoplate® HS: High-speed corrosion-resistant nickel-phosphorous coating (> 12%)

Argalux® NC: Cyanide-free hard-silver plating process (130 HV)

Silvertech® RBH: Cyanide-based hard silver-plating process (180 HV)

Silvertech® MSH: High-speed hard-silver plating process (130 HV & 15–20 ASD)

Stannopure® PF 10: Green high-speed tin plating process

Pretreatment and anti-tarnishes

Pre- and post-treatment are crucial to achieving appropriate surface treatments on metal finishes. The most important and often overlooked step is post-treatment, which ensures long-lasting surface properties of the final finishes. We have the right anti-tarnish for every surface.

SuperDip Cu 1000: Surface cleaning processes for aluminum and its alloys

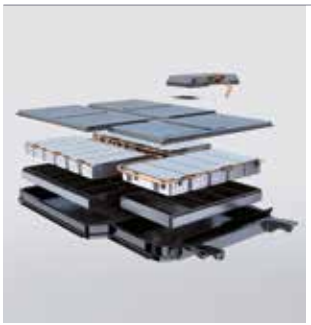
Puronon®: High-speed cleaning pretreatment for copper and copper alloys

Argalin® XL: Chromium-based anti-tarnish, ROHS compatible (CrIII) for silver, copper, and nickel

Protectostan®: Product family to protect tin from heat or humidity exposure

Battery housing and fasteners

Battery housings manufactured from aluminum or steel require protection against corrosion to ensure the longevity of the components. Subsequent coatings, both electrolytic and electroless conversion coatings, best adhere to clean surfaces. We offer a full range of sustainable cleaners, surface preparation, and adhesion promoter processes for battery modules and housings.
Steel battery housing components are best protected against corrosion with our highly efficient electrolytic-based coatings, which provide unmatched corrosion resistance. With Atotech electrolytic and zinc flake-based coatings, fasteners and fixings for battery assembly meet the high demands for reduced contact corrosion, improved conductivity, and defined coefficients of friction.



Sustainable solutions for battery housings

The pretreatment of the aluminum battery housing ensures superior adhesion of paint and a high level of corrosion resistance. When defects arise in the paint, the housing must undergo complete paint removal to eliminate the risk of in-field failures.

UniPrep®: Long life, low-temperature degreasers suitable for steel and aluminum battery components

Interlox®: Zirconium-based conversion coatings and passivates for enhanced corrosion protection and paint adhesion

Master Remover®: Sustainable paint removal process ideal for part reclamation and rack and fixture cleaning

The electrolytic plating of steel battery housing results in high-performance corrosion protection. An appropriate passivate will ensure perfect adhesion to subsequent paint or fire retardant.

Zinni® + Reflectalloy®: Acid and alkaline zinc nickel electrolytes for highest corrosion protection requirements

EcoTri® + Tridur®: Passivates to enhance corrosion protection and adhesion to subsequent coatings

Battery housing fasteners

For brackets, fixtures, and fasteners that fix joints at the contact of metal- and nonmetal material mix, Atotech electrolytic zinc, zinc nickel, and Hiron® processes, together with the appropriate post-treatment of passivates, sealers, and top coats, provide high corrosion protection, stable and specific clamping forces, and improved contact corrosion.

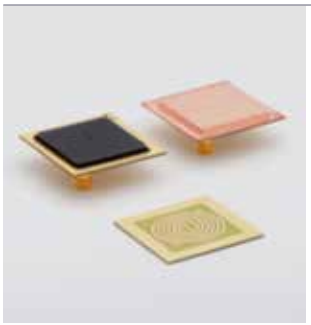
Zinni® 220 + EcoTri® NC + Zintek® Top XT: System with stainless steel appeal, passing 120 cycles of ASTM G85 A5 cyclic corrosion test

Zinni® AL 450 + EcoTri® HC 2 + Techseal® Clear: System for achieving the lowest possible contact corrosion

Hiron® + EcoTri® NC + Sealer 350 WL8: Nickel- and cobalt-free system for high corrosion protection with adjusted coefficient of friction properties

Electromagnetic shielding

Modern cars are equipped with features for both convenience and safety. All of these emit and may be affected by electromagnetic radiation-based interference. Electric vehicles also include additional sources such as power converters, electric motors, traction batteries, or chargers. When a power source and victim are placed near each other, electromagnetic interference between them must be safeguarded with shielding.



Conductive and soft magnetic electroplated layers

For a wide range of applications, we offer pre-treatments to plate directly onto molding resins for components, PCBs, or highly engineered plastic housings to protect the electronics systems. With our portfolio of highly-conductive and soft magnetic electroplated layers, we support high shielding effectiveness for low-frequency electromagnetic radiation.

CovaBond® MR: Adhesion promoter for plating on molding resins and dielectrics

Permalloy EMS: High saturation magnetization, low hysteresis nickel/iron plating electrolyte

Cupracid® EMS: High-speed low stress copper plating electrolyte

NovoPlate® BF: High-speed boron-free nickel-phosphorous deposition process

Anode lead tabs

Lithium battery pouches must be perfectly sealed to prevent the formation or emergence of hydrofluoric acid. The insulation material must therefore firmly adhere to the anode lead tab. We offer the complete coating process, from pretreatment to nickel processes for barrier layer or conductive layer plating to the adhesion promoting and corrosion-resistant trivalent chromium-based top layer for improved adhesion between the insulation and lead tab.

Lead tab adhesion

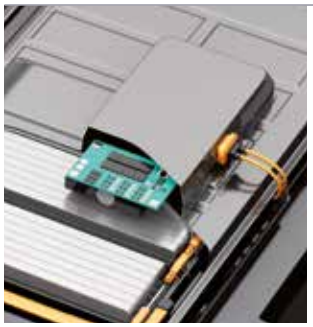
Corrosion can decrease adhesion properties and lead to separation and swelling. The improved corrosion protection of Atotech products prevents the formation of hydrofluoric acid within the battery pouch pack. For adhesion in lead tab manufacturing, we offer the following processes:

NovoPlate® HS: High-speed corrosion resistance nickel-phosphorous coating (> 12% P)

Satilume® Plus: Unique matte nickel surface for higher adhesion and better corrosion resistance

Battery and cell management

As an integral part of the battery, the battery management system must be highly durable, reliable, and productive. The electronic package must withstand higher temperatures and high humidity over extended periods to improve its lifetime. Automotive requirements for the whole IC package have thus become more and more stringent, adding extra heat exposure tests on top of moisture sensitivity level (MSL) testings.



Lead frame IC packages and Printed Circuit Boards

We have developed specific reliability boosters such as adhesion promotors that can overcome package delamination issues under heat and humidity as well as solder joint improvement processes that are specifically designed for QFN packages.

MoldPrep™: Adhesion promotor between copper and mold material to improve MSL test level and survive heat treatment

AgPrep™: Non etching adhesion promotor for silver plated lead frames and mold material to improve MSL test level and survive heat treatment

PpfPrep™: Non etching adhesion promotor for pre plated lead frames with mold material to improve MSL test level and survive heat treatment

Stannatech®: Product family for highly reliable immersion tin deposits

Stanna-Q®: Immersion tin process specifically designed to form 3D solder joints on QFN wettable flanks

MKS offers a full range of sustainable functional and decorative surface treatments

Battery competency

Reliable, high-quality processes for metallic and plastic substrates exceeding industry standards.

Global presence

Sales and service for our Atotech products in more than 40 countries enable us to provide efficient customer support worldwide. Many of our products are approved by numerous OEMs worldwide.

Best local service

Our unique global TechCenter network allows us to offer an unmatched spectrum of services, from pilot production, chemical and materials science investigations to comprehensive training for customers and business partners.

Leading technologies

We collaborate heavily with the entire value chain to seek new paths and set benchmarks for the development of innovative surface finishing processes.

Production know-how

We provide customers with complete factory design concepts. Our production systems guarantee the highest level of quality and efficiency in wastewater treatment solutions, all at a reduced cost.

Sustainable solutions

We use less hazardous chemicals whenever possible, eliminate waste water to the greatest extent possible, as well as reduce our carbon footprint.