ionPOWDER

plasma technology

ionics
surface technologies

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Ion Implantation technology and processing

IONICS has developed with MATERIA NOVA's engineers an innovative low-pressure plasma coating process to treat powders and loose parts. The innovation is supported by the Walloon Region through the WALIBEAM project which gathers major industrial actors in the fields of surface treatment of glass, metal and polymer.

IONICS present the ionPOWDER low pressure reactor. The equipment allows the surface modification of micrometric powders, fibers and loose parts using the Hardion ion source. Hardion is an industrial ion gun solution solving different technical and economic issues generally associated to the process. It enhances the surface properties of your material without any coatings and using an environmentally friendly technology. The system can also be equipped with PVD and PECVD low pressure plasmas deposition processes. Composition fine tuning, new alloys with rare elements, core shells hybrid structure, nano structuration are reached for enhanced properties and processes using commercial low-cost powders.

Process Advantages

- Low temperature surface treatment: bulk materials initial properties are preserved.
- No coatings: unpealable surface as the material itself is modified in its depth.
- Parts geometry respected: no machining resumption.
- Precise and localized surface treatment: optimized process time and final technical performances optimized.
- Electrical conductivity is not necessary: any insulating materials might be treated. Environmentally friendly dry process: no chemical waste.

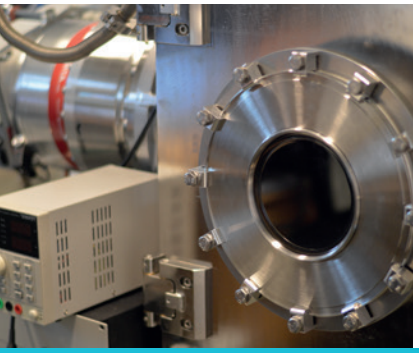
Gains on materials

- Steels: surface hardening (x4 for stainless steels), strong decrease of the friction coefficient and exceptional abrasive wear resistance.
- Stainless 316L: from 400 to 1800 Hv on 10µm with digressive profile, friction coefficient divided by 2, pitting resistance multiplied by 10.
- Aluminium: surface hardening (x7), strong decrease of the friction coefficient, higher corrosion resistance.
- Copper and copper alloys: strong resistance to oxidation and abrasive wear, surface hardening (x4).
- Gold: surface hardening (x7), increased densities, strong decrease of porosity of electroplated layers.
- Titanium: surface hardening (x7), decrease of the friction coefficient.
- Magnesium: surface hardening (x3), cracking resistance and higher corrosion resistance.
- Platinum: surface nano-structuration (catalytic properties), reduction of the friction coefficient.
- Polymers (PC,PEEK,PMMA,PP,PU…): hardness increasing (x10) and creation of antistatic properties.
- Elastomers (NR,CR,EPDM…): hardness increasing and reduction of the friction coefficient.

The fields of application are numerous:

- Thermal spraying: increased flowability, better adhesion…
- Additive manufacturing: new alloys, enhanced laser absorption, increased densities, decrease the porosity…
- Catalysis: enhanced efficiency and selectivity, lower running temperature…
- Sintering: increased thermal conductivity, better cohesion…
- Composites materials: enhanced compatibilization, hollow conductive structure, increased conductivity…

The ionPOWDER system has also been developed to coat small loose parts as connectors, technical balls, fixing systems with the aim of enhancing wear durability, thermal and electrical conductivity or simply for decoration purposes. Low pressure technologies as PVD and ion implantation allow to treat any materials, insulating or thermally sensitive, without wet steps and toxic products. The technology is very flexible and leads to an incredible variety of highly performant coating.



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