

# Cost saving and highly flexible coating technology for new applications of micro- and nanolayers in industry and research

## Summary

Profile type	Company's country	POD reference
<b>Technology offer</b>	<b>Austria</b>	<b>TOAT20220523016</b>
Profile status	Type of partnership	Targeted countries
<b>PUBLISHED</b>	<b>Commercial agreement with technical assistance</b> <b>Research and development cooperation agreement</b>	<b>• World</b>
Contact Person	Term of validity	Last update
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## General Information

### Short summary

An Austrian SME offers novel atmospheric plasma coating processes enabling new combinations of coatings and substrates (even paper, plastic, wood etc.) and complex substrate shapes. Easy and fast development / production of new coatings (biocidal, conductive, anticorrosive, tribological etc.) are made possible. The plug-and-play solutions save 60% of operating costs. Industrial partners, R&D departments, research institutes are sought for commercial, technical, license or research cooperations.

### Full description

For many industrial applications materials have to be functionalized by full-bodied or local coatings (e.g. conductive, photocatalytic, barrier or anticorrosive layers). State of the art coating processes like PVD or CVD (physical or chemical vapour deposition) lack of process speed and deposition rates. Furthermore, expensive vacuum chambers are needed and environmentally harmful solvents are often used. These challenges result in low cycle times and high production costs.

The Austrian company succeeded in developing new atmospheric plasma spraying (APS) processes to overcome the mentioned challenges. These atmospheric coating processes can be implemented inline and nearly all types of materials (e.g. paper, plastics, fabric, wood, metals,...) with any design can be coated. Coating thicknesses from a few nm up to 1000 µm can be achieved with high process speeds.

The core technology is the targeted feeding of powders or precursor into the plasma jet, which is up to several

10,000 °C hot. As a result, almost any coating material with a melting point up to 2000 °C can be processed (depending on particle size, shape and general warnings). As a consequence of using powder materials or precursors, a very high coating quality can be achieved by simultaneously low thermal input into the substrate through the focused plasma jet. Compared to other atmospheric pressure coating processes this innovative technology enables material combinations that did not exist before. In particular high-melting powders or glass-like coatings can be applied to sensitive surfaces without being thermally damaged.

The technology can be delivered as plug and play solution or R2R (roll-to-roll) setup to promote fast and reliable development processes or to foster an efficient and maintenance-friendly production. Through modular design, open interfaces and customisation options it can be adapted to all feasible coatings. In the coating chamber substrates can be moved fully automated in any coordinate direction.

Technical details:

- Power: 0,5 - 17 kW infinitely variable with high process efficiency
- Coating speeds: up to 500 mm/s
- Spraying width: 10 - 90 mm
- Microlayers: 10 - 1000 µm possible
- Nanolayers: 10 - 300 nm possible
- Substrate materials: metals, plastics, ceramics (porous materials such as filters), glass, paper, wood, textiles, CRPs (carbon reinforced plastics), foils,...
- Coating powders: copper, tin, zinc, titaniumoxide, PEEK (Polyetheretherketone), silicon based precursors,...
- Process gas: Argon

With the novel plasma coating process conductive, anticorrosive, antiviral, antibacterial, tribological, low-friction or non-stick layers as well as layers with adhesion improvement can be achieved with high process accuracy and speed. The application areas reach from electronics, ICT to biotechnology, automotive, chemical applications and adhesive technology.

Some examples and latest applications:

- printed circuit board tracks on thin PET (Polyethylene terephthalate) foils for electric components
- LED wallpapers/films, pannel lights, 3D LED lamps
- adhesion promotion layers on glass, plastics etc. for printing, inking and gluing applications
- antibacterial and water-repellent swabs (for medical applications, for example wound dressings)
- biocidal coatings for public sector applications (transport, health)
- low friction coatings on 3D-printed materials

Various equipments for different applications have already been sold worldwide.

The Austrian company is looking for R&D departments, research institutes and industrial partners in the above mentioned fields to buy the novel technology for their product or process innovations. It offers technical assistance for installation and operation (commercial agreement with technical assistance), adaptations to specific requirements (technical cooperation), license agreements and conjoint development of new coating applications via R&D projects (research cooperation).

### Advantages and innovations

Main advantages of the novel APS technology and processes:

- highly flexible process => various combinations of coating materials and substrates possible
- deposition of high melting powders or precursors on temperature sensitive substrates like paper, wood, textiles or any kind of plastic is made possible (low thermal impact on the substrates)
- applicable for complex substrate shapes (3D-printed materials)
- full-body coatings and local coatings (>500µm<sup>2</sup>) possible
- easy switch from micro- to nanolayers
  
- easy and fast development of new coating systems
- efficient and maintenance friendly serial or even mass production
- 60% savings in operating costs compared to other APS processes (when applying the same powder material)
- fully automated process (R2R, plug-and-play,...)
- low cycle times (multi torch design, high feed speeds, high deposition rates)
- high process and deposition efficiency

Further advantages:

- each coating machine is CE certified
- highly adaptable production lines
- implementation of modular coating or plasma cells in an existing production line
- essential savings in operating time, costs and space compared to PVD, CVD and galvanic baths (compared to CVD the novel APS process features deposition rates which are at least 500 times higher)
- no vacuum installation needed

### Stage of development

**Already on the market**

### IPR Status

**IPR granted**

### Sustainable Development goals

- **Goal 9: Industry, Innovation and Infrastructure**
- **Goal 3: Good Health and Well-being**

## Partner Sought

### Expected role of the partner

Specific area of activity of the partner sought:

- researcher, developer and/or manufacturer of coatings and surface treatments for applications in electronics, ICT, automotive, public sector (biocidal coatings), biotechnology, chemical industry and many more
- active in the area of conductive, anticorrosive, biocidal, tribological, hydrophobic, hydrophilic layers as well as layers for adhesion improvements, non adhesive properties, barrier properties etc.
- interested in developing new surface properties for their products or new products

The technology is suited for R&D departments of companies, research institutes as well as production orientated industry partners.

Task to be performed by the partner:

- commercial agreement with technical assistance: partners willing to buy the novel system for their product development or research activities; the Austrian company provides training, full technical support and know how for specific application cases to the partner;
- license agreements are also possible;
- technical cooperation agreement: the technology can be customized according to the specific requirements of potential partners;
- technical cooperation agreement: in-house layer development according to the specific requirements of potential partners (no job order production possible);
- research cooperation agreement: the Austrian company is open to engage in the development of new coating applications together with potential partners in the framework of funded European research programmes;

Type of partnership

- **Commercial agreement with technical assistance**
- **Research and development cooperation agreement**

Type and size of the partner

- **SME 11-49**
- **University**
- **SME <=10**
- **Big company**
- **SME 50 - 249**
- **R&D Institution**

## Dissemination

Technology keywords

- **01002001 - Micro and Nanotechnology related to Electronics and Microelectronics**
- **02002015 - Surface treatment (painting, galvano, polishing, CVD, ..)**
- **02002002 - Coatings**
- **02007024 - Nanomaterials**
- **05005 - Micro- and Nanotechnology**

Targeted countries

- **World**

Market keywords

- **08001018 - Polymer (plastics) materials**
- **03001001 - Semiconductors**
- **03001007 - Circuit boards**
- **08001007 - Coatings and adhesives manufactures**
- **05004001 - Electromedical and medical equipment**

Sector groups involved

- **Nano- and Microtechnologies**
- **Materials**

## Media

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### Images



[focus research - R2R - flexible printed circuits line](#)

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[focus production - small coating chamber, efficient and safe aspiration](#)

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[focus research - plasma coating torch on robot](#)

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[focus research - coating cell, 3D substrate carrier system](#)

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