

- 1 Coated rivets
- 2 ALMA 1000 plant

## ALMA 1000

### EXPERIMENTAL PLANT FOR COATING BULK GOODS VIA PLASMA-ACTIVATED HIGH-RATE DEPOSITION

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A business unit at Fraunhofer FEP develops technologies for coating of substrates having non-even geometry.

These coatings allow, for example, improvement of corrosion resistance, scratch resistance, or abrasion resistance of components. Decorative requirements and other specific functionalities can also be realized by selecting suitable coating materials.

In our experimental plant ALMA 1000 we can process small components of any material as bulk goods. The technological setup allows plasma pre-cleaning (plasma-etching) of the small components, sputtering of adhesion promoting layers, and coating with

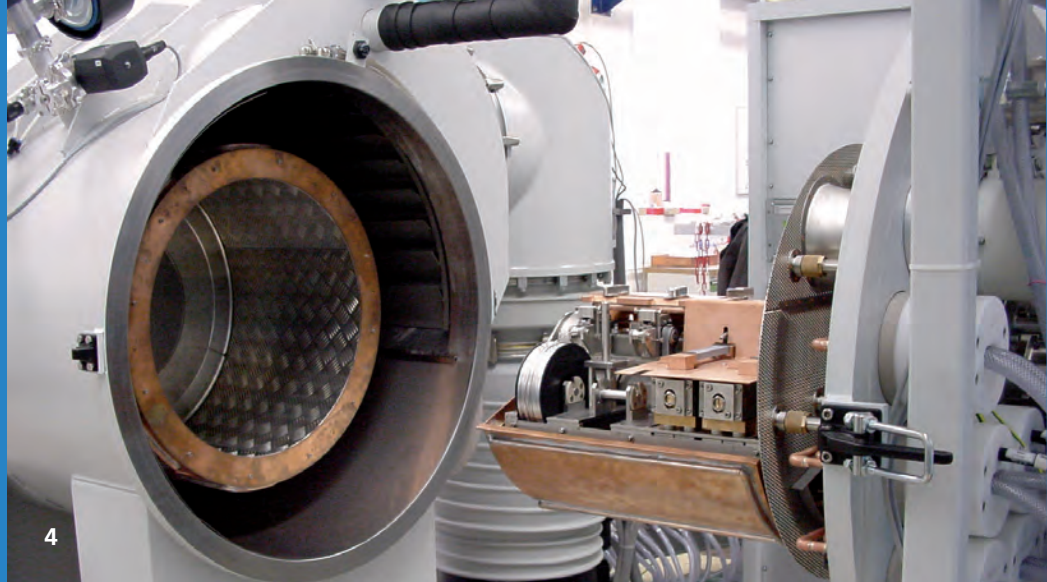
various layer materials using plasma-activated high-rate deposition.

One main area of our work is optimization of the technological processes and the substrate handling for bulk product treatment, in order to adapt the functionality of the layer to the relevant coating requirements and to the substrate geometry.

The advantage of vacuum coating compared to conventional wet-chemical or metallurgical coating processes is the high layer quality and the range of layer structures that can be achieved. Environmental soundness and cost-efficiency are further positive side-effects of the technology.



3



4

### Technical specifications

coating chamber	batch coater with bulk goods drum with unit for agitation of the bulk goods
coating modules	<ul style="list-style-type: none"> <li>▪ 2 boat evaporators</li> <li>▪ 1 hollow cathode</li> <li>▪ 1 magnetron</li> </ul>
boat evaporators	max. 7 g/min per boat continuous wire feed
hollow cathode module	300 A, 25 kW
pulse magnetron power supply	10 kW, 800 V, max. 30 A pulse current at up to 350 kHz pulse frequency
etch/bias pulse power supply	20 kW, 400 V, max. 200 A pulse current at up to 33 kHz pulse frequency
bulk goods drum	max. 120 rpm rotation direction can be reversed
max. batch weight	30 kg
computer-controlled process management and data acquisition	

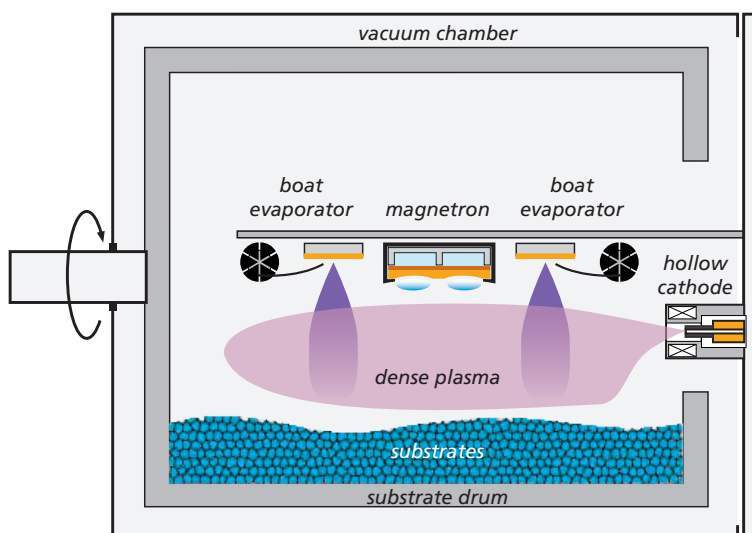
### Technologies

- plasma pre-treatment with hollow cathode
- pulse magnetron sputtering
  - sputtering of adhesion-promoting layers
- plasma-activated high-rate deposition
  - evaporation of low melting point metals and alloys (e.g. Al, AlMg, Cu, ...)
  - deposition of compound layers using the reactive HAD process

### Our offer

- technology and process development
- feasibility studies
- sample coatings

### Schematic representation of the ALMA 1000



We focus on quality  
and the ISO 9001.

3 Boat evaporators

4 Coating chamber ALMA 1000