DEVELOPMENT OF COATINGS AND PROCESSES FOR MODERN PRODUCTS

The development of coatings is traditionally understood as developing materials which enable customers to meet the ever increasing demands on products and components. The ultimate goal of process development is to provide a technology which either ensures the deposition of metals or metal compounds by means of novel techniques or continuously improves conventional processes. For our customers, we develop plating materials that meet the needs of a particular application and provide the processes necessary for going into production.

Untapped potential in coating development

Electroplating offers opportunities to advance and adapt conventional plating metals such as chrome, nickel, copper or zinc but also to create new coating materials or multi-layer coatings from novel processes, for example from dispersion coating or alloy plating.

WAYS OF DEVELOPING COATINGS

Dispersion coating

Dispersion coating refers to the deliberate inclusion of foreign matter in electroplated coatings. These particles are generally insoluble in the electrolyte used for electroplating, their diameter ranging from nanometer scale up to 0.5 mm. There is a wide variety of particles in use, from hard material to dry-film lubricants, but it is also possible to include encapsulated liquids in the metal coatings. By deliberately modifying the coating, it can be tailored to specific requirements, opening up new fields of application.

Multilayer and gradient coatings

Multilayer and gradient coatings are best qualified to enable the definition of specific coating properties. This is particularly true for systems where the plating metal – and thus the electrolyte – remains unchanged. So, simply by modulating the current, a coating can be created with precisely defined properties that may vary across the profile.

Alloy plating

Binary or ternary alloys are used in industry for decorative and technical applications. New demands for an increased range of properties or the ban of individual substances set the stage for intensified development activities. The advantage of alloy coatings is that the properties can be very precisely defined by adjusting the composition. With alloy coatings, it is particularly important to think ahead – already in the development phase – as to what kind of industrial application is intended and what process window is required.

THE PATH OF PROCESS DEVELOPMENT

Tools used in the development of electroplating processes typically include beakers, Hull cells or small standard equipment. They are all limited in terms of reproducibility, information content, and efficiency. For this reason, we have developed and implemented a platform called »Fraunhofer IPA electrolyte test bench« which realistically and accurately simulates industrial working conditions on three-dimensional test specimens. In our technical center, we have several of these systems available for process development purposes.
Constant electrolyte monitoring as part of process development
To provide our customers with a process that is ready for industrial application, the electrolytes are continuously monitored and the chemicals being used are tested with a view to long-term stability and performance characteristics. In monitoring the electrolytes, either common analysis methods are used or an analytical instruction is developed that suit the needs of the process.

Standard coating characterization for coating and process development
The coating properties are ranked among the key parameters in coating and process development. We offer standardized test specimens to our customers which can be tailored to their process needs. With our defined analysis methods for characterizing the coatings, we are in a position to quickly establish how method and coating properties are related.

Transfer into small-scale production
An essential step in process development is to transfer the results of new developments to production. As many companies are equipped with manufacturing facilities only, they cannot test new systems. We provide an opportunity to map the complete electroplating process chain for serial parts on our automated electroplating system – at a scale of 60 liters.

Have we caught your interest?
Feel free to contact us – we look forward to your call or your visit