

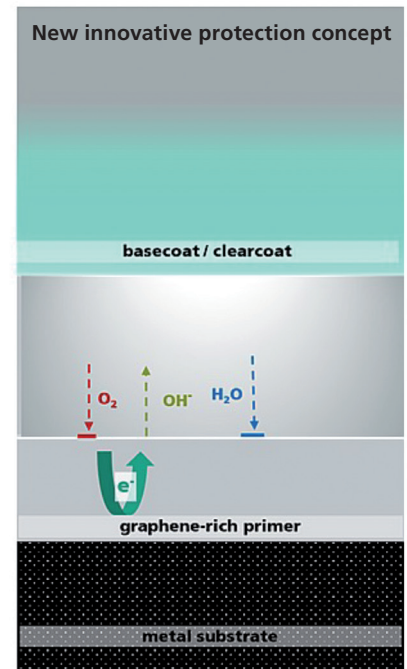
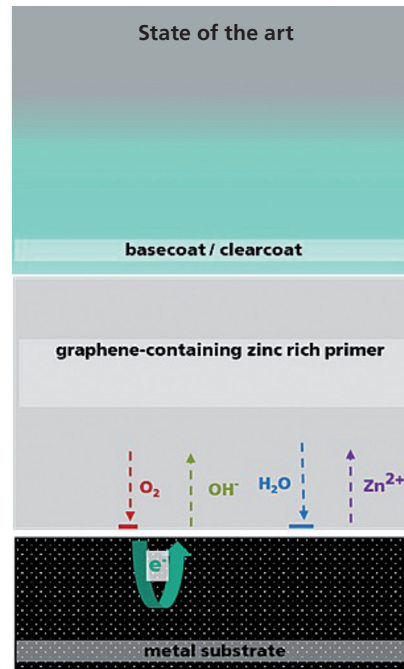
Smart Steel Technology

Graphene rich primer license

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The Smart Steel Technology developed by Fraunhofer IPA is an intelligent anti-corrosion technology for coating surfaces that combines corrosion monitoring with corrosion protection. The core of the technology is based on a graphene rich primer consisting of a combination of a first and a second functional filler component and the binder matrix polymer.

The first filler component comprises carbon platelets, which not only give the coating the necessary hydrophobicity but also create an oxygen barrier and a water barrier as well as a certain electrical conductivity. The hydrophobicity of the coating decreases its ability to absorb and store water, important aspects for any protective coating. To adjust the electrical conductivity without affecting the barrier properties, a certain quantity of carbon nanotubes is added to the primer formulation as a second functional filler component. This additional electrical conductivity has several advantages. For example, the discharge of oxygen is transferred from the metal surface to the surface of the graphene rich primer, thus suppressing the cathodic delamination of the primer coating on the metal surface. Furthermore, the corrosion potential, which is created by the corrosion process, can be identified and a defined electrical polarization automatically applied.



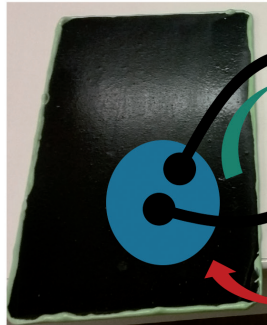
In a nutshell, through the unique combination of the two functional carbon-based fillers, the Smart Steel Technology allows the corrosion protection system to be adjusted in line with environmental conditions and customer demands as far as corrosion protection and monitoring are concerned, and can easily be extended by an active polarization concept if needed.

Smart Steel Technology based on graphene rich primer enables:

- state-of-the-art corrosion protection (water and oxygen barrier)
- corrosion protection using polarization
- online corrosion monitoring

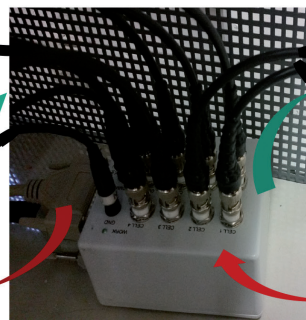
sensor

Graphene rich primer



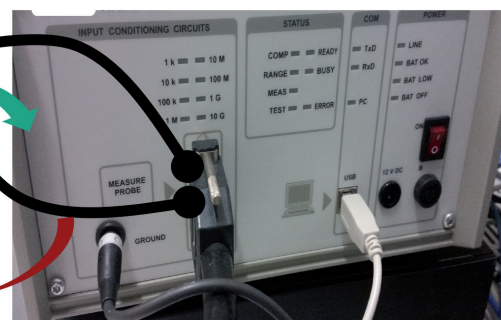
data transfer

switch to control



data analysis

control unit



polarization

response

The **Smart Steel Technology** can be automated in that the polarization is directly regulated by the online monitoring unit. The concept can be also used for a general sensor coating layer.

If you are interested in a license for the graphene rich primer and for more information about our Smart Steel Technology, please contact us.

About Fraunhofer Institute for Manufacturing Engineering and Automation IPA

With nearly 1200 employees, the Fraunhofer Institute for Manufacturing Engineering and Automation, Fraunhofer IPA, is one of the largest institutes in the Fraunhofer-Gesellschaft. The total budget amounts to € 82 million. The institute's research focus is on organizational and technological aspects of production. We develop, test and implement not only components, devices and methods, but also entire machines and manufacturing plants. Our 19 departments are coordinated via six business units, which together conduct interdisciplinary work with the following industries: automotive, machinery and equipment industry, electronics and microsystems, energy, medical engineering and biotechnology as well as process industry. The research activities of Fraunhofer IPA aim at the economic production of sustainable and personalized products.

Future is our product: sustainable, personalized and smart

Our research efforts and development work are geared towards the cost-efficient manufacture of sustainable and personalized products. They are based on two strategic cornerstones: mass sustainability, which aims at minimizing the consumption of resources while maximizing the standard of living, and mass personalization, because we want to combine the cost advantages of mass production (economies of scale) with those of flexibility (economies of scope). Our ultimate goal is to make it possible to manufacture personalized products in lot sizes of 1 at the same price as mass-produced goods.

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