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ARE SELF-CLEANING PAINTS BELLS AND WHISTLES OR PRACTICAL NOVELTIES?

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What do you usually do in the morning on a weekday? Probably, you wake up, take a shower, have breakfast, and go to work by car. Often the car body gets dirty due to adverse weather conditions, and you have to use the services of car washes. According to statistics, most people visit car washes 2–3 times a month as the car gets dirty. What if there is a way to avoid pollution, and therefore the expenses of a car wash? Self-cleaning paints can solve this problem. They are different from ordinary paints in that they repel liquids, allow dirt to roll off the surface along with raindrops. This is called the «lotus» effect: dirt rolls off the petals and leaves of this plant due to the fact that they are covered with a waxy coating.

Coatings based on self-cleaning paints not only allow the surface to stay clean longer, but also increase its wear resistance, reduce the aggressive impact of external factors.

These coatings can be used not only for cars, but also for building facades, ceramic tiles, etc. Self-cleaning paints are designed to make our lives easier. But is it worth to use them? Do they have any negative effects? How well is this area studied? Can an ordinary person afford such paint?

The unique properties of self-cleaning paints are due to the peculiarities of the surface relief at the micro-and nanoscale. The relief is formed in such a way as to reduce the contact area of the liquid with the surface of the body. To do this, use the tools of nanotechnology. Nanotechnology is a whole field that deals with the development and study of small particles with unique properties. Their size ranges from 1 to 100 nm, so they are called nanoparticles. And self-cleaning coatings are sometimes called nano-coating.

The «lotus» effect is based on physical and chemical phenomena, so self-cleaning coatings can be produced for various materials. Currently, scientists are working on the development of self-cleaning products and coatings in a variety of fields. For example, the automotive industry, construction, production of protective fabrics, paint coatings, ceramic tiles and much more.

Green Earth Nano Science Inc. has developed a self-cleaning transparent coating based on nanotechnology, Solar Stucco. They are easy to apply on any surface and do not pose any harm to the environment. Photocatalysts in the coating decompose organic pollutants under the influence of sunlight. Decomposition products are easily washed away by rain. And the surface remains clean for a long time. This technology is used for the production of building materials. The use of Solar Stucco coatings reduces cleaning costs and protects the environment from chemicals. Ultimately, the overall cost of maintaining the building is reduced.

The line of Nanox brand car cosmetics was developed by the domestic company «AGA» in cooperation with the American company «DoctorWax». In the compositions of the products are nanoemulsion. They provide more efficient cleaning and give the treated surfaces a strong dirt-and water-repellent effect. The manufacturer claims that these preparations meet the most modern requirements and are characterized by increased efficiency, while they are easy to apply, do not require a long time for surface treatment and allow you to get the maximum effect with minimal effort.

Currently, the company «PPG», the world leader in the field of automotive coatings, is developing a special coating. Its peculiarity is that small scratches and scuffs on the surface will disappear by themselves over time.

The automotive industry also uses a hydrophobic nano-coating in the form of films. They cover the car windows. No wet film forms on the treated glass. All the liquid is collected in many droplets, which are instantly carried away by the flow of oncoming air. Thus, the glass remains transparent. The hydrophobic coating not only repels moisture, dirt and snow, but also protects your glass from minor scratches. Many manufacturers apply such coatings already at the factory, for example, Nissan, Volvo.

Based on the «lotus» effect, paint and varnish materials have been developed. They created a structure of nanoparticles through the introduction of pigments and fillers. Caparol has developed the Caparol Clean Concept standard. It involves maintaining the cleanliness of the facade coating and their pristine appearance for a long time. Nanotechnology helps to reduce the adhesion of dirt particles, photocatalysis reduces their number. These paints combine hydrophobicity with high porosity. This provides an optimal combination of reliable protection features.

This article discusses the features of self-cleaning coatings, their principle of operation and application. Currently, a range of products based on the «lotus» effect have been developed for various fields, such as hydrophobic facade paints, non-fogging mirrors and ceramics, low-polluting bactericidal textiles, and much more. The wide range of applications of self-cleaning coatings indicates good prospects for the development of nanotechnology in many areas of human activity.

In addition, the use of self-cleaning paints based on nanotechnology can eliminate the use of environmentally harmful paints. During the drying process of conventional paint, various solvents are released into the atmosphere. This problem is solved by powder coatings that do not contain volatile organic compounds.

Manufacturers are doing everything possible to supplement the list of products based on the «lotus» effect and make them available to ordinary people. The consumer chooses these products, as they allow to save, for example, on the maintenance of the car. On average, windscreen wipers are used 50% less often, and car service expenses are reduced. Thus, this coating is a promising investment in order to preserve the original appearance of your car for a long time.

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