

Press Release

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News from Nanotechnology:
Midget Particles Combat Mould, Algae, and Nosocomial Germs

A new, nanotechnology-based coating destroys micro-organisms without adverse health effects / A solution for mould and hygiene problems

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In a research project conducted jointly with the Oberhausen paint manufacturer Bioni CS GmbH, researchers of the Fraunhofer Institute for Chemical Technology at Pfinztal near Karlsruhe succeeded in developing a non-toxic coating based on nanotechnology that will permanently protect exterior and interior walls from attack by moulds and algae and will even destroy nosocomial germs that are resistant to antibiotics.

A newly-developed combination of active nano-ingredients consisting of particles a thousand times smaller than most spores and bacteria effectively eliminates the need for biocides, fungicides, and preservatives and, by the same token, the environmental and air pollution that usually emanates from these substances.

Some Details about This Innovative Coating:

Obnoxious and dangerous: moulds in the home

Micro-organisms such as fungi, bacteria, and algae are ubiquitous and important elements of our natural environment. If, however, they take the form of patches of mould or algae on interior or exterior walls they quickly turn into an obnoxious problem. In recent years, interior mould attack has become a problem of swiftly increasing importance. There are several reasons for this. On the one hand, modern building technology has contributed towards the increasing incidence of damage caused by moulds in buildings. On the other hand, medical researchers and doctors have been observing more and more respiratory and allergic complaints arising from exposure to moulds.

Conventional 'anti-mould coatings' will work only for a limited time. Besides, they may be dangerous to the environment and to human health

A representative study conducted by the University of Jena shows that one in three homes in Germany is confronted with problems arising from moulds and damp. Estimates indicate that the annual cost of repair and prevention runs to several hundred million Euros. Frequently, so-called 'anti-mould coatings' are used in rehabilitation. While these are certainly short-term remedies, they do not offer a satisfactory solution for the problem in the long run, for the length of time for which the biocides and fungicides used in these coatings remain effective is highly restricted, and there is no longer any dispute about the fact that they endanger human health and pollute the environment.

Midgets battling micro-organisms –

nanotechnology provides a pioneering solution for the mould problem

The objective of the joint research project of the Fraunhofer Institute for Chemical Technology and the Bioni company was the development of a combination of active ingredients which could be used in wall paint to prevent mould growth not only temporarily but permanently, i.e. for years. At the same time, the new coating system should have no polluting affect whatsoever on the air in a room, to protect both human health and the environment. To achieve this, researchers made use of the most recent nanotechnology know-how. Non-toxic nano-particles having an average diameter of c. 10 nanometres (corresponding to one hundred thousandth of a millimetre) form the most important constituent element of the newly-developed anti-bacterial coating, which was

given the name 'Bioni Nature'. With these dimensions, the particles of the active ingredient are about 1,000 times smaller than most of the spores and germs to be controlled. Microbiological tests have demonstrated that any mould spores coming into contact with the Bioni Nature coating and the nano-particles integrated in it are destroyed in very short order.

A quantum jump in paint technology: environmentally-friendly mould control

As the nano-ingredients used by the researchers are solid bodies that are extremely stable chemically, the anti-microbial effect of the coating is permanent. In other words: There will be none of the rapid deterioration of the coating's protective function caused by the exhalation of active ingredients that is common in commercial coatings incorporating volatile biocides. Together with the fact that no commercial biocides, solvents, plasticisers, and preservatives are used, this characteristic material property ensures that the Bioni coating has no polluting effect on the air in a room. This was confirmed in tests conducted by the Product and Environment TUV in Cologne, after which the Bioni interior paint systems were awarded the TUV Rhineland Emission Test Seal for wall paint.

Even nosocomial germs do not stand a chance

Not only moulds have been very much in the news recently; all over the world, reports are piling up about dangerous nosocomial germs that are resistant to antibiotics. In Germany alone, an estimated 500,000 people are infected by these germs every year. In tests conducted by ISEGA, a research and test corporation located in Aschaffenburg, it was demonstrated that the new Bioni coatings will combat even these normally resistant germs extremely efficiently. Tests demonstrated that direct contact with a Bioni coating resulted in populations of *Staphylococcus aureus*, a highly dangerous nosocomial germ, being reduced by 99.6%. This shows that 'Bioni Hygienic', a coating specifically developed for use in medical institutions, is capable of improving hygienic conditions in hospitals and clinics sustainable and without adverse health effects.

Nano-particles also protect exterior walls and roofs from attack by algae and moss

As of now, Bioni will be using the recently-developed combination of active nano-ingredients as a standard element in its exterior coatings. The objective is to prevent permanently the formation of unsightly patches of green algae, particularly on heat-insulated outer walls, a phenomenon that is becoming increasingly frequent. That nano-particles are fully as effective when used against algae and moss was shown in a series of tests conducted by the materials testing institute of the government of Bremen, in which the 'Bioni Perform' house paint was certified as having a highly efficient long-term effect against algae growth without releasing any algicides into the environment.

A wide choice of applications

Thanks to their nano-technology ingredients, the applications for Bioni coatings are many and varied including, for instance, rooms affected or threatened by damp and mould as well as areas inhabited by particularly sensitive people such as children, allergies, or elderly persons. Hygienic improvements may be expected from the application of these coatings in nurseries, schools, kindergartens, bathrooms, hospitals, and nursing homes as well as in living rooms, bedrooms, offices, storage and production rooms, hotels, wellness areas, and pools affected by mould. At the same time, Bioni house paints and roof coatings may be used to protect the exterior of buildings permanently and conservatively from attack by algae and moss.

As the anti-microbial properties of the combination of active nano-ingredients used in the Bioni coatings has other potentials besides protecting the surface of houses and walls, the Fraunhofer ICT is now planning to introduce this technology in other industries. Enquiries from all over the world have already been received. A few of the potential applications in which these coatings might be used include dental implants, synthetic bones, catheters, artificial heart valves, food packages, and toys.

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Non-toxic coatings: